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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

Organ of the U. C. Ent. Society

THE ENTOMOLOGIST'S DAILY POST CARD.

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ANNOUNCEMENT.

The two things most needed for the study of Entomology in California are a series of synopses of our species and a bibliography of our literature. We will attempt to fill these wants by presenting this material in card form. The bibliography is so arranged as to cut to the small library size.

The region covered in this paper will include all the adjoining states as well as California and the species not recorded as being found in this State will be indicated by the initial of the State in which they do occur.

Notes of current interest in entomology and in economic entomology will be given from time to time. Particular attention will be given to methods of collecting and preserving insects including preparations for microscopical study.

Another important feature will consist in seasonable hints for teachers of entomology.

As the official organ of the University of California Entomological Society it will contain the notices of the society and accounts of its proceedings.

CRESSON E. T.
63.
List of the North American species of Bombus and Apathus
Proc. Ent. Soc Phil. Vol. III. pp. 83-115.
Bombus californicus, Smith: occidentalis, Green.

1151943

Thorax all yellow above
With yellow on three segments of the abdomen
Head yellow above ..... **morrisoni**, Cress. N.
Head all black ..... **nevadensis**, Cress.
With yellow on only two segments of the abdomen ..... **juxtus**, Cress. N.

Thorax black and yellow above
Tip of abdomen black
With yellow on all of the first four segments
No black on the first two segments above
Scutellum yellow ..... **fervidus**, Fabr.
Scutellum black ..... **pennsylvanicus**, DeG.
The middle of the first two segments of the abdomen above black ..... **centralis**, Cress.
Abdomen with yellow on segments 1 2 4 & 5 **edwardsi**, Cress.
Abdomen with yellow only on the fourth segment ..... **californicus**, Smith.

Tip of abdomen yellow
Part of the abdomen black
Segments 1 2 & 3 black ..... **occidentalis**, Green.
Segments 1 & 2 black ..... **crotchii**, Cress.
Segments 1 & 2 [illegible] ..... **howardii**, Cress.
Segments 3 4 & 5 black ..... **oregonensis**, Cress. O.
All of the abdomen above yellow ..... **appositus**, Cress.

Bumble bees have always attracted considerable attention [illegible] species deserve very careful study. The queens, the pe[illegible] females are called may be found during the winter under [illegible] logs.

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[illegible] is well worth the peculiar value of The Entomologist's Daily Post Adv[illegible] class of advertising. It will reach particularly scientists, teachers and horticulturists of the Pacific coast.

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...o. 2. Berkeley California. Jan. 3 1895

Destructive Locusts, a popular consideration of a few of the more injurious locusts (grasshoppers) of the United States, together with the best means of destroying them.

U. S. Department of Agriculture, Division of Entomology, Bulletin 25. 62 pp. 1 map.

Caloptenus spretus Thos. atlanis Riley femurrubrum Harr. devastator Scudd. differentialis Thos. bivittatus Scudd. Cammula pellucida Scudd.

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University of California Entomological Society.

At a business meeting held day before yesterday the By laws which appear in this issue were adopted and the following officers elected:

President E. J. Wickson.
Vice President J. J Rivers
Secretary and Editor
C. W. Woodworth.
Treasurer S. J. Holmes.

The following new members were also elected: B M. LeLong, Alexander Craw, Dr. H. H. Behr. Chas. Fuchs, Chas. C. Riedy, E. C. VanDyke, Prof. A. J. Cook, C. H. Shinn, and W. G. Harford.

The date of the next meeting is not yet decided.

—o—

Among the recent additions to the collections at the University is a fine set of more than five hundred Japanese Lepidoptera and Coleoptera kindly donated by the passenger department of the Union Pacific System.

The synopsis to day is of our large stripped june beetles. The larvæ are found in the ground occasionally becoming numerous enough to do considerably injury.

Polyphylla.	Scarabæidæ.	Coleoptera,
Front tibiæ tridentate		cavifrons, Lec.
Front tibiæ bidentate		
Head and thorax hairy, few scales		crinita, Lec.
Head and thorax scaly, hairs short		decimlineata Say.

BY LAWS OF THE UNIVERSITY OF CALIFORNIA ENTOMOLOGICAL SOCIETY.

Art. 1. The object of this Society shall be to advance the science of Entomology in all its branches.

Art. 2. Members may be elected at any meeting of the Society. They shall pay to the Treasurer of the Society the sum of Two Dollars and Fifty Cents per annum in advance and membership will be forfeited if payment is not made within six months These annual dues may be compounded by paying at one time Twenty Five Dollars.

Art 3. The Officers of the Society shall be President, Vice President, Secretary and Treasurer who shall constitute the Executive Committee and manage the affairs of the Society. They shall be elected by vote of the Society at the first meeting and at any time thereafter at the request of two members provided one months notice be given

Art. 4. TheMeetings shall be held at the University of California at times to be determined by the Executive committe.

Art. 5. The Executive Committee shall be authorized to arran e for the publication of entomological matter with the money obtained from dues and from any other source provided that no debts be incurred and that a copy of all that is so published be mailed to each member not in arrears.

Art 6. These by laws may be amended by vote of the Society at any time at the request of two members provided that two months notice be given of such proposed amendment.

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A synopsis, catalogue and bibliography of the Neuropteroid insects of temperate North America.

Trans. Am. Ent. Soc. Vol. XIX. pp. 327 - 373.

Pteronarchys proteus Newm. californicus Newp. regelaris Hag. N. Dictyoptera sigmata Hag. Calotermes castaneus Burm. marginipennis Latr. Termopsis angusticollis Walk. occidentis Walk. Leptinotus piceus Hey. Siphlurus dissimus Eat. exquisitus Eat. O. intermedius Eat. A. occidentalis Eat. N. Heptagenia bruneea Hag. N. integrum Eat. O. nitidus Eat. par Eat. A. Botisca obesa Say Leptophlebia gregalis Eat. C. con.

A New Insect Box.

A box posessing many good features has been recently tried at the entomological laboratory and will probably de adopted for the collections there. It consists of a glass top and bottom with tin sides and with a cork sheet arranged to slide out at one end.

The glass used is eight by twelve inches The tin is in four pieces. The two longer sides are made of pieces four by eleven inches bent at right angles one inch from each long edge. Half of this is again bent back making a groove a half inch deep on each edge to receive the glass. These pieces are an inch shorter than the glass, the other two are an inch longer than the ends, that is nine inches. These are bent in the same manner as the sides but before it is bent a triangular piece is cut out at each corner this is accomplished by cutting along the lines of the first folds one inch and then in diagonally from the corners. Now if the box is put together and the projecting ends bent down it is complete. To open one end of the tin is pulled off and the cork slipped out. There was no difficulty in getting sufficiently tight oints.

Pteronarchus	Perlidæ	Pseudoneuroptera

Face all drrk brown

Antennæ pale at base.....**proteus**, Newm

Antennæ black .....**regalis**, Newm N.

Labrum chypens redish .....**californicus**,Newp

These are perhaps the commonest snsects of the Order at this season. The young live in the water.

Spraying fot Codlin Moth.

Judging from the abundance of wormy fruit in the market and the numerous letters of inquiry received at the Experiment Station in refeaence io this subject it appears the kdowledge eaze and value of preventive treatment is not as widely known as it should be. No treatment can be expected to entirely prevent all the injury from this source but most of it can be prevented. The method is to apply Paris green or London purple in the form of a spray to the trees two or three times during the spring. The proportion of the poison to the water ahould be about one pound to a hundred and fifty to two hundred gallons. Care must always be takeo to keep the mixture stirred while it is being applied as the is very prone to settle. In applying the mixture the apparatus may be ylaced in a wagon and as it passes down the rows the trees may be sufficiently sprayed without stopping if a proper noxzle is used. The cost of this treatment is very little The exact time for making the applicaiion can not be given as is not the same for all localities, As a general rule however there is no advantage in spraying till the fruit is about ready to hang down and atleast two weeks should intervere between applications

The question as to the danger from the use of such strong poi ons upon fruits that are to be eaten has often been discussed and there is no evicence that they need be feared on this score. It would be on the safe side and not spray within a month of picking time

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o. 4. Berkeley California. Jan. 5 1895.

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A synopsis, etc.

palliqes Hag. N. rufivenosa Eat. vaciva Eat. O. Callibaetis pictus Eat. tes elata Hag. lestes stulta Hag. Argia vivida Hag. Ischnura cervula Selys. defixa Oxyagrion rufulum Hag. Pyrrosoma abbreviata Selys. Enallagma robusta Selys. Agrion exclamationis Selys Herpetogomphus compositus Selys. O. Ophiogomphus bison Selys morrisoni Selys. Octogomphus specularis Selys. Gomphus confraternus Selys. olivaceus Selys. sobrinus Selys. Progomphus obscurus Ramb. O. Tachopteryx hageni Selys N. Cordulegaster dorsalis Selys O. Anax junius Drury walshinghami Nclach. Macromia magnifica Selys pacifica Hag. Libellula subornata Hag. forensis Hag. saturata Uhler A

BANKS N.

92.

con.

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A Cyanide Bottle.

There is now on the market a turned wood bottle which makes a very servisable cyanide bottle. The stopper is made hollow and can be made to contain the poison in plaster of Paris in the usual way This stopper can be used in a glass bottle though it is apt to slip out.

—o—

The synopsis to day takes up the genera of a very important amily of beetles. It will run through three or four numbers. The butterflies of the family Nymphalidæ will be next treated in this way. The Editor invites suggestions as to groups which it is desirable to have synopses.

An apology is due the readers for the large number of typographlcal ersors which oecured in the last issue as it was printed and mailed before the proof was read, fortunately the mistakes are not misleading.

The first issue for this year of Psyche the journal of the Camcridge Entomological Club contains much that is interesting especially the articles on the life history of Lepidoptera.

Middle legs very wide apart
Middle and hind tibiæ slender.....Canthon.
Middle and hind tibiæ much widened towards the tip
Third joint of the labial palpi distinct.....Phanœus.
Third joint of the labial palpi obsolete
Antennae nine jointed, scutellum invisible..Onthophagus.
Antennae eight jointed, scutellum distinct....Oniticellus.
Middle legs close together
Abdomen all covered by the elytra
Abdomen with six segments visible beneath
Antennae nine jointed
Mandibles visible beyond the clypeus.....Ægialia
Mandibles concealed beneath the clypeus
Hind tarsi with triangular joints.....Psammodius.
Hind tarsi with elongate joints
Head roughly granulate or verrucose...Rhyssemus.
Head punctured or slightly plicate
Outer angle of hind tibiae prolonged spiniform.....
.....Ateuchus.
Outer angle of hind tibiae obtuse.....Aphodius.
Antennae ten jointed
Epimera of metathorax covered.....Orchodœus.
Epimera of metathorax visible.....Pachyplectrus.
Antennae eleven jointed
Club of antennae three jointed
Eyes four.....Odontæus.
Eyes two.....Geotrupes
Club of antennae five to seven jointed.....Pleocoma.

cor.

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o. 5. Berkeley California. Jan. 7 1895.

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Banks N.

92.

A synopsis, etc.

Dythemis mendax Hag. A. Mesothemis collocata Hag. illata Hag. longipennis Burm. Diplax corrupta Hag. glacialis Hag. N. mandida Hag. Chauliodes californicus Walk. Raphidia admixa Hag. oblita Hag. Inocellia hageni Abb. inflata Hag. longicornis Abb. Symphasis signata Hag. Chrysopa oculata Say externa Hag. Nothochrysa californica Banks* Polystoechotes punctatus Fab. Hemerobius tutatrix Fitch Acanthaclisis congener Hag. O. Maracanda henshawi Hag. O. Brachynemurus abdominalis Say blandus Hag. N. longipalpus Hag. sackeni Hag. Myrmeleon immaculatus DeG. exitialis Walk. ferox Walk. Pyrnax furcifer McL. A. Bittacus apterus McLach. chlorostigma con.

Hints for Teachers.

First Paper.

We conceive that the prime object of all instruction is the development of more correct habits of of thinking. The subjects taught should therefore be chosen and presented with this idea foremost in the mind of the teacher. The ever increasing prominence given to scientific studies testifies of their peculiar suitableness for the purposes of instruction. The essential element of this fitness is their concreteness. It is the study of nature at first hand.

If the study is allowed to degenerate into mere text book work or into the simple accumulation of facts it becomes less valuable than almost any thing else. Dont study about nature but study nature.

Entomology claims an important place for a number of reasons among which is the abundance of the material for study. The fact that there are more species of insects than of all other animals and plants together gives some idea of the superabundance of the material.

An insect always to be had and presenting a rich field for study

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No. 5. Berkeley California. Jan. 7 1895.

A synopsis, etc.

Dythemis mendax Hag. A. Mesothemis collocata Hag. illata Hag. longipennis Burm Diplax corrupta Hag. glacialis Hag. N. mandida Hag. Chanliodes californicus Walk Raphidia adhixa Hag. ohlita Hag. inocellia hageni Abb. infiata Hag. longicornis Abb Symphasis signata Hag. Chrysopa oculata Say externa Hag. Nothochrysa californica Banks* Polystoechotes punctatus Fab. Hemerobius tutatrix Fitch. Acanthaclisis congener Hag. O. Maracanda henshawi Hag. O. Brachynemurus abdominalis Say blanchus Hag. N. longipalpus Hag. sackeni Hag. Myrmeleon immaculatus LeG. exitialis Walk. ferox Walk. Pynax furcifer McL. A. Bittacus apterus McLach. chlorotigma con.

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Jo. 6. Berkeley California. Jan. 8 1895.

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92.

BANKS N.

A synopsis, etc.

McLach. Panorpodes oregonensis McLach. O. Boreus californicus Pack. Limnephilus gravidus Hag. Notidobia grisecla McLach. nigricula McLach. Silo californicus Hag. Kosopus podager McLach. Agapetus celatus McLach. Heteroplectron californicum McLach. Tinodes consueta McLach.

Hints for Teachers.

First Paper. con.

is the common honey bee.

A very valuable exercise may be made of the comparison of the three regions of the body They may be viewed from many standpoints and the treatment will depend upon the capacity of the student In any case the study should be directed towards answering tne question which two are most alike and which the most peculiar.

Some of the points that might be touched in this way are the degrees of agglutination of the segments, of the suppression of the appendages. of the functional specialization and the development of special organs. Any of these thoughts could be developed in classes even of the primary grades with the necessary simplificaton of the language. The insect should always be thought of as a developed being in every organ of which may be traced the history of its genesis.

The best results will always come from comparative study. No insect can be properly studied by itself but it is well to continuously refer to other insects.

Scarabæidæ **Coleoptera.**

Front claws different from the others.....**Orsonyx.**
All the claws alike.....**Diplotaxis.**
Front coxæ transverse
Claws unequal
Clypeus united to the front without suture
Mandibles emarginate or bidentate externally **Pelidnota.**
Mandibles entire.....**Plusiotus.**
Clypeus distinctly separated from the front.....**Cotalpa.**
Claws equal
Clypeus narrowed in front
Labial palpi inserted at the sides of the mentum
Head and prothorax entirely unarmed **Cyclocephala.**
Head or prothorax at least with a tubercle
Elytra striate.....**Ligyrus.**
Elytra not striate
Prosternal process hairy.....**Dynastes.**
Prosternal process glabrious.....**Megasoma.**
Labial palpi inserted behind the mentum..**Phileurus.**
Clypeus very broad infront
Ventral segments connate
Metaplura narrow
Claws with a single tooth.....**Lachnosterna.**
Claws more or less serrate.....**Listrochelus.**
Metaplura wide
Club of antennæ many jointed.....**Polyphylla.**
Club of antennæ three jointed.....**Thyce.**
Ventral segments free.....**Phobetrus.**

This family of beetles differs from all others in the structure of the antenna the last few joints of which open like the leaves of a book.

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Lepidoptera Mounting.

The ordinary setting board arranged with a groove to receive the body of the insect seems to be the only one described in entomological works. A much simpler one has been used by me for years and except for a few Bombycids and Sphingids which have a very convex thorax it prooves to be thoroughly satisfactory.

It consists simply of a smooth board with awl holes just large enough to receive the head of the pin The insect to be set is pinned in the usual way and then the head of the pin thrust into one of the holes. The dorsum of the insect thus comes in contact with the board. The process of fastening the wings in position is exactly the same as with other boards. The legs may be arrang- with much greater facility when set in this way. A small piece of paper slipped down on the pin will be found useful for this purpose. The awl holes should not be much larger than the pin head so as not to permit too much motion while setting.

The side of the house under the shelter of a porch may become in this way doubly useful.

95.
Life History of Clisiocampa Fragilis Stretch.
Psyche, Vol. VII. pp. 189-191.
Clisiocampa fragilis, Stretch.

Telonomus.	Proctotrypidæ	Hymenoptera.
Length about one millimeter		**kœbelei**, Ashm.
Length six to eight millimeters		
Mandibles black		**californicus**, Ashm.
Mandibles red		
Abdomen truncate behind, shorter than the thorax		**gnophœelæ**, Asnm
Abdomen pointed behind, longer than the thorax		**clisiocampæ** Riley.

This is our most important genus of egg parasites. They are easily reared by collecting the egg masses of moths during the winter and enclosing them in tight boxes jars or bottles untill spring. Work of this kind would doubtless soon greatly increase the number of species known to this region.

New Nozzles.

A number of new forms of nozzles have appeared within the last year or so Among the most interesting of these is one known as the McGowen. Like most eastern nozzles it is designed to throw a wide spreading stream of considerable size with a low pressure. This nozzle delivers a flat spray of exceptional quality both as regards fineness and eveness of distribution. In neither of these does it equal such a nozzle as the cyclone but it is the best flat spray that has come to our notice Another nozzle of very recent design should receive special commendation. It is the Bean cyclone a Californian nozzle designed for our peculiar high pressure winter spraying The special features of this new nozzle are the simplicity of construction and the convenience of operating the plunger. The nozzle need only be pushed against a branch if it becomes clogged.

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A Monograph of the Sphingidæ of America, North of Mexico.
Trans. Am. Ent. Soc. Vol, XV. pp. 49 - 242,

Hemaris thetis Bd. cynoglossum H. Edw. rubens H Edw. Lepisesia ulalume Strk. O. phæeton G & R. clarkiæ Bd Ellops tantalus Linn. L. Dolephila gallii Rot lineata Fabr. Philampelus achemon Dru. Dilophonota ello Linn. Protoparce celeus Hub. carolina Linn. cingulata Fabr. Sphinx crupifarum S. & A. perelegans Edw. vancouverensis Edw. O. libocedrus Edw. A. cher is Hub. sequoiæ. Bd dollii Newm. A. elsa Stak. A. Tripogon modesta Harr. Smerinthus cerysii Kirby Arctonotus lucidus Bd.

Ladybirds.

The past season has seen in a great many places more than the ordinary quantity of plant lice and a corresponding large number of ladybirds. In some localities the latter congregated in immense numbers last fall preparatory to hibernating. The winter thus far has been exceptionally rainy and it would be well to carefully examine all colonies that may be found to determine the per cent that are alive. Plant lice late last fall were very generally affected with fungus diseases and it is to be feared the damp weather this winter may have induced similar diseases among the hibernating ladybirds.

—o—

As a further explanation of our Bibliography it may be said that we will attempt to cover all current publications of a scientific character touching the insect fauna of California, Lower California, Arizona. Nevada and Oregon.

The first line gives the author's name and the date of publication, then follows the title and bibliographical reference and then a list of species accredited to this region.

Spots on the abdomen orange
Tibiæ strongly spined ..... **celeus,** Hub.
Tibiæ feebly spined ..... **carolina,** Linn.
Spots on the abdomen rose red ..... **cingulata,** Fabr.

These are moths which develop from the tobacco or tomato worms. The pupa is a very conspicuous object. It is the large brown body with a process like a pitcher handle which is so often thrown out of the ground in the spring with the spade or plow where ever their food plants have grown the year before. The moths have a wonderfully long tongue to obtain honey from flowers and from their habit of taking their food without alighting they have earned the name of humming bird moth.

Microscopical Mounts of Insects.

This note is written to call attention to the possibility of mounting insects even of considerable size for microscopical study in a very simple manner in toto. The process is to drop the insect in alcohol for say five minutes though the smallest may not need more than one minute. The alcohol should be strong and not be allowed to weaken by evaporation. If the insect is rather large it may now be placed on a slide with an abundance of alcohol and a cover placed upon it and tapped till the specimen is sufficiently flattened and until any fatty material that may be squeezed out is washed away. If this is not well done the specimen will have a hazy appearance when finished. Smaller specimens do not need this treatment. The next step is to soak off the alcohol with a cloth as it lies on the slide and drop on it at once a drop of oil of cloves. After about five minutes this is also soaked off and replaced by balsam. The cover is now placed on and the mount is complete.

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No. 9. Berkeley California. Jan. 1[illegible] 1895.

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84.

Revised Catalogue of the Diurnal Lepidoptera of America, North of Mexico.

Trans. Am. Ent. Soc. Vol. XI. pp. 245 338.

Papilio philenor Linn. machaon O. oregona Edw. O. zolicon Bd. americus Koll. A. indra Reak. pergamus H. Edw. hairdii Edw. A. asterias Fab. eurymedon Bd. rutulus Bd. daunus Bd. A. N. O. pilumnus Bd. thoas Linn. A. Parnassius clodius Men. smintheus D. - H. Neophasia menapia Feld. Pieris ilare Godt. A. beckerii Edw. sisymbri Bd. occidentalis Reak. protodice B. - L. napi Esper. Nathalis iole Bd. Anthocaris lanceon.

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Note Taking.

Every one recognizes the importance of recording ones observations however little he may do of actual note taking himself.

If a collection is being made some form of note with each specimen is almost essential. Locality and date should always be known of a specimen and generally be attached to it This is perhaps all that can conveniently be placed on the label. For preserving other data recourse must be had to figures refering to the notes or the date may serve this purpose. The best plan is to use both date and number and they will serve as checks upon each other. The greatest objection to the use of numbers is the ease when absent minded of writing the wrong number.

The question whether books or slips should be used for taking notes depends on personal adaptation. Both methods have their advantages. The best plan for one who has not decided this matter is to use a note book and a pad of note slips and by means of carbon paper make a record on both. One will in this way very soon discover his preference.

Nymphalidæ. **Lepidoptera.**

Subcostal vein with five branches..... **Danais.**
Subcostal vein with four branches
Palpi short
Veins not dilated at base
Hind wings of ordinary shape
Front wings of ordinary shape
Discal cell of both wings closed ..... **Argynnis.**
Discal cell of hind wing open
Internal margin of front wings somewhat sinuous..... **Agraulis.**
Internal margin of front wings not sinuate
Palpi normal
Head small..... **Limenitis.**
Head large
No eye spots or crescents..... **Melitæa.**
With eye spots and crescents on the hind wings.. **Phyciodes.**
Palpi acicular..... **Eresia.**
Discal cell of both wings open..... **Junonia.**
Front wings truncate at tip
Slightly sinuate..... **Synchloe.**
Strongly sinuate..... **Pyrameis.**
Hind wings scolloped, lobed, dentate or tailed
Discal cell of both wings closed..... **Anæa.**
Discal cell of hind wings open
Hind wings scolloped..... **Heterochroa.**
Hind wings dentate..... **Euptoieta.**
Discal cell of both wings open

con,

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No. 10. Berkeley California. Jan. 12 1895.

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The Labeling of Collections.

There are innumerable ways of labeling a collection. The following plans are very comonly used. For the larger groups a label somewhat like this is used;

NYMPHALIDÆ.

This may be placed on the outside of the box and at the head of the row, and either just before or just after each species a label as:

Danais archippus.

with the addition perhaps of the abbreviation of the name of the authority. Others use one label for the genus name, thus:

Danais. Latr.

and another for the species name without repeating the name of the genus, thus:

archippus. Fabr.

The size of the label chosen should be such that a certain number will exactly reach across the box.

84.

EDWARDS W. H.

Revised Catalogue etc.

ceolata Bd. creusa D. - H. hyantis Edw. ausonides Bd. cethura Feld. morrisoni Edw. thoosa Scud. A sara Bd reakirtii Edw stella Edw. julia Edw. A. Callidryas eubule semine Linn. A agarithe Bd. A Colias eurydice Bd eurosonia Stoll eurytheme Bd. harfordii H. Edw. occidentalis Scud emilia Edw. O behrii Edw. Terias gundlachia Poey A. protdrpia Fabr. A.nicippi Cram. damaris Feld. A. lisa B - L. A Danais archippus Fabr. berenice Cram. A. strigosa Bates A. Agraolis vanillæ Linn Argynnis nokomis Edw. A. nitocris Edw. A. N. leto Behr carpenterii Edw. A nausicaa Edw A. hippolita Edw. O. zerene Bd. egelis Bd. helena Edw. A. epithore Bd. Euptoieta claudia con.

Hind wings scalloped..... .....**Apatura.**
Hind wings lobate or tailed
No silvery or golden spots..... .....**Vanessa.**
A silvery or golden spot on the under side of the hind wings.....**Grapta.**
Veins dilated at base
Wings elongate, apex of front wings produced
Middle tibiæ scarcely half as long as the femur.....
.....**Hipparchia.**
Middle tibiæ more than half as long as the femur.....
.....**Chionobas.**
Wings rounded, apex not produced
Three veins in the front wings enlarged at base .....
.....**Cœnonympha.**
Two veins in the front wings enlarged at base
Middle tibiae with many long spines.....**Gyrocheilus.**
Middle tibiae with but few small spines or none
Margin of hind wing dentate or waved.....**Satyrus.**
Margin of hind wing entire.....**Neonympha.**
Palpi long .....**Libythea.**

The Nymphalids are the most important family of butterflies. They may be at once recognized by the small size of the front legs which are no more used for walking but are held up against the body and almost concealed among the scales. The following list of species includes all the genera of the family represented in this region by a single species: Agraulis vanillae, Linn. Eresia punctata, Edw. A. Synchloe crocale, Edw A Anaea morrisonii, Edw. A. Heterochroa californica, Butl. Hipparchia ridingsii, Edw. N. Geirocheilus tritonia, Edw.

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No. 11. Berkeley California. Jan. 14 1895.

QL 565 .C5 E5 ENTO

The Woolly Aphis.

One of the most unsatisfactory insects to try to exterminate in the orchard is the woolly aphis of the apple. Like the Phylloxera of the grape it can not be destroyed on the roots without injuring the plant The most useful measure in both cases is the use of resistant stock. There are methods of treatment however by the persistant use of which the injury by the lice is reduced to practically nothing, the loss being only the cost of the treatment. One of the most important of these is the continual destruction of those on the stems. This is easily accomplished by spraying with resin soap or kerosene emulsion. If the insects are abundant they will be so thickly covered with the woolly material that more than one treatment will be necessary to kill all. Another important measuure is to protect the crown of the tree for injury by the lice here more often causes the death of the tree than at any other point. The lice are very seldom the immediate cause of the death of the tree, and where they attack the crown

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Cram. hegesia Cram Meditaea chalcedon D - H colon Edw O anicia D. - H. nubigena Behr quino Behr baroni H Edw. rubicunda H Edw editha Bd. sterope Edw. O. acastus Edw N. palla Bd whitneyii Behr hoffmanni Behr gabbii Behr perse Edw. A. chara Edw. leanira Bd. alma Str A. thekla Edw bollii Edw A. minuta Edw. A. arachne Edw. A. nymphia Edw. A. Phyciodes nycteis D - H. A. carlota Reak. A. pratensis Behr. orseis Edw. mylitta Edw montana Behr. picta Edw. A. Eresia punctata Edw. A. Synchloe crocale Edw. A Grapta interrogationis Fab A. satyrus Edw. rusticus Edw faunus Edw silvius Edw zephyrus Edw silenus Edw. Vanessa antiopa Linn

con.

Two longitudinal veins between the fifth and the posterior margin
Last joint of the palpus not longer than the two preceding joints taken together
A single submarginal cell
Antennæ fourteen jointed..... **Dichranomyia.**
Antennæ sixteen jointed..... **Elliptera.**
Two submarginal cells
Tibiæ without spurs at tip..... **Gonomyia.**
Tibiæ with spurs at tip
Subcostal cross vein posterior to the origin of the second longitudinal vein
Antenna fifteen to sixteen jointed
No supernumerary cross vein between the auxiliary vein and the costa
Wings wholly glabrious..... **Limnophila.**
Second vein, both its branches and the tips of the other veins pubescent..... **Phyllolabrus.**
A supernumerary cross vein between the auxillary vein and the costa..... **Trichocera.**
Antenna six to ten jointed..... **Eriocera.**
Subcostal crossvein anterior to the origin of the second longitudinal vein
Small cross vein nearly at right angles with the longitudinal axis of the wing..... **Amalopsis.**
Small cross vein very oblique..... **Pedicia.**
Last joint of the palpus whiplash shaped and longer than the three preceeding together
Antenna about as long as the head..... **Holorusia.**

con.

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No. 12. Berkeley California. Jan. 15 1895.

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The Woolly Aphis. con. suckers are produced in excessive numbers and gall growths on these, until a very great enlargment is produced. Like all such growths this is very apt to dry up and in the fall the dead tissue is very apt to decay and to become infested with toad stools or related fungi. These gaining entrance in this way are generally able to kill the tree.

The common treatment with wood ashes or a very little gas line about the crown is thus valuable not for destroying the insects but for protecting a vulnerable part of the tree. For trees already having considerable swellings at the crown a good practice would be to treat this part about once a year with some fungicidal mixture to overcome the fungi.

The insect should be kept out of a new orchard as long as possible. In setting an apple orchard all the stock should be closely examined for the small characteristic swellings produced by this insect. If any are found it is well to remove the earth cleanly from the roots and dip them in kerosene and at once heel in to prevent injury by the oil.

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californica Bd. milberti Godt. Pyrgus ariella Hbn. lavinia Edw. cashni Lint. cerve Hais. Junonia coenia Hub. grisea Fab. A. Limenitis arthemis Edw. A. weidemeyeri Edw. A. disippus Godt. Argynnis Bd. Speyeria coronis callippe Bd. S. zerene Bd. S. nokomis Edw. A. leilia Edw. A. Euphydryas editha Bd. Nemeobius lucina Haw. A. rubricata Edw. A. Comenympha california W. H. etc. Edw. N. ochracea Edw. A. ampelos Edw. C. brenda Edw. A. pamphile L. Ceratrichia trifoliata Edw. Hipparchia nevadensis Edw. N. satyrus Behr. H. gabbii Edw. C. wheeleri Edw. A. meadii Edw. A. silvestris Edw. celtis Bd. A. studiosa con.

. **Tipulidæ** **Diptera.**

Antennæ twice as long as the head
Antennæ not pectinate in either sex
Anterior branch of the fourth vein with its fork stalked....
.....**Tipula.**
Anterior branch of the fourth vein with its fork not stalked
.....**Pachyrrhina.**
Antennæ of the male pectinate .....**Ctenophora.**
Only one longitudinal vein between the fifth and the posterior margin.....**Ptichoptera.**

The Tipulids are often called daddy long legs, sometimes crane flies. Their larvæ are quite tough skinned worms and so have received the name of leather jackets. They feed on the roots of plants.

The Study of Entomology.

It matters little what particular insect is studied. It matters more how it is studied. In general study that which is most available, and always from nature for "if you study nature from books, when you go out of doors you cannot find her." Study habits through structure and vice versa.

Every structure means something, and the pupil should be taught to ask himself constantly "What does this mean." Lead them to see the development and evolution of the insect.

Compare every insect studied with all previously studied, and find in what respects they are alike, or different, and try to get them to see the reasons for similarities or differences.

Drawing from nature is a valuable aid in this work and should be encouraged no matter how poor the results may be at first. Agassiz said "A pencil is the best of eyes."

M. W. T

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Bd. Chionobas iduna Edw. californica Bd. C. nevadensis Feld. ivallda Mead Libythea bachmanni Kirtl. A. carinenta Cram A. Ienucias momo Feld A. cythera Edw. A. virgulta Behr nais Edw. A. palmerii Edw A. ares Edw. A Eurygona abreas Edw A. Calephelis australis Edw. A. nemesis Edw. Thecla grunus Bd. halesus Cram melinus acadica Edw. N. A. californica Edw itys Edw. A. auretorum Bd. dryope Edw sylvinus Bd. spadix H Edw tetra Behr chalci Behr septum Bd nelsoni Bd. adenostomatis H. Edw. tasita H. Edw. spinetorum Bd siva Edw. A. clyrie Edw. A. leda Edw A. ines Edw A. behrii Edw troides Bd. A. fotis Str. cryphon Bd. dumetorum con.

University of California Entomological Society.

There will be a meeting of the Society in the Entomological Laboratory Saturday January 19. at 2 P. M. Each member will be expected to present an observation Any one interested is invited to attend.

—o

Daily or Weekly.

There are some who have expressed the desire to receive their papers weekly instead of daily To such we will say that though we shall continue to issue as at present, their copies will be held and mailed in bunches weekly or monthly as directed.

This paper is designed to form a card index to the insects of California and adjoining States and all subscriptions will be supposed to begin with number one unless otherwise stated

—o—

The synopsis to day is tha beginning of a very extensive one covering the genera of one of our most important families of beetles and is given by request. We expect to follow it by synopses of the species of a few selected genera of the same family.

Ventral segments of abdomen entirely horny
Middle coxæ without trochantines
Mentum concealing both maxillæ and ligula
Meta-episterna very wide, front trilobed
Middle lobe of front truncate, mandibles concealed..... **Craniotus.**
Middle lobe of front long, clasped by the mandibles..... **Edrotes.**
Meta-episterna narrow
Front broadly rounded
Outer angle of front tibiæ prolonged. **Eurymetopon.**
Front tibiæ truncate at tip ..... **Emmenastus.**
Front uni- or trilobed
Apterous, metasternum short
Middle lobe of the front clasped by the mandibles
Intercoxal process of the abdomen broad and rounded or truncate in front
First joint of the hind tarsi as long as the third and fourth together
Mandibles with a basal tooth which clasps the middle lobe of the front..... **Triorophus.**
Mandibles without basal tooth..... **Stibia.**
First and fourth jonts of hind tarsi equal..... **Triphalus.**
Intercoxal process of abdomen triangular, acute or oval at tip..... **Trimytis.**
Mandibles not clasping the middle lobe of the front.... **Auchmobius.**

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No. 14. Berkeley California. Jan. 17 1895.

QL 705
ENTO

The Origin of Complex Metamorphosis.

The simple metamorphosis such as occurs in the grasshopper is accomplished by means of a series of moults in which the hardened part of the skin is cast off and at which time the degeneration of certain parts and the growth of others modifications of the structure is produced. The moulting period is always more or less a time of rest and the more profound the change to be accomplished the more prolonged is this period. This is particularly true of the last moult in most insects with simple metamorphosis. The still greater prolongation of this "sickness" until it takes all the time between the last two moults produces the complex metamorphosis.

Further development produces structural characteristics adapting it better to this new condition and unfitting it for active life. Thus the nature of the stage becomes fixed.

The differentiation of the pupa stage permits a very much greater amount of difference between the young and the adult insects than was before possible.

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Bd. apana Edw. A. laeta Edw. A. fuligino a Edw. A. rubidus Edw. A. fra ilis Edw. A. ly-
cena heteronea Bd. clara H. Edw. N. A. fulla Edw. Maeadalia Behr sagiolus Bd. rear-
oides Bd. pheres Bd. plebeios Bd. ardea Edw. S. xerxes Bd. antiaca Bd. Agelamas
Doubl. sagittigera Feld. speciosa H. Edw. sonoriensis Feld. polaris Feld. enoptes Bd.
battoides Behr shasta Edw. nicissa Edw. A. N. lotis Lintn. acmon D. H. anna Edw.
pseudargiolus B.-L. amyntula Bd. monica reak. alice Edw. A. gyas Edw. A. exilis Bd.
marina Reak. Carterocephalus manitou Edw. omaha Edw. Copaeodes proris Edw.
arene Edw. A. wrighti Edw. pontis Edw. A. cunus Edw. Pamphilia taxiles Edw. ru-

Winged, metasternum long
Front tibiæ with two spurs
Prosternum prolonged, received by the mesosternum ..... **Epitragus.**
Prosternum not prolonged..... **Chilometopon.**
Front tibiæ with one spur..... **Cnemodius.**
Mentum concealing either maxillæ or ligula but not both
Tibial spurs distinct ..... **Batulius.**
Tibial spurs very minute
Front coxæ widely separated
Eyes transverse, finely granulated
The joints at end of antenna connate
Antenna truncate at tip..... **Zopherus.**
Antenna pointed at tip
Antenna received in a deep groove..... **Phœodus.**
Antennal grooves obsolete behind..... **Noserus.**
All the antennal joints free..... **Phillopsis.**
Eyes round, coarsely granulated..... **Usechus.**
Front coxæ close together
Antenna ten jointed..... **Dacoderus.**
Antenna eleven jointed..... **Arœoschizus.**
Middle coxæ with distinct trochantines
Labrum scarcely visible
Front tibia broadly dilated..... **Anepsius.**
Front tibia slender
Tibial spurs minute..... **Nictoporus.**
Tibial spurs large

con.

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No. 15. Berkeley California. Jan. 15 1895.

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ricola Bd. oregonia Edw. columbia Scud. nevada Scud. N. A. manitoba Scud. juba Scud. harpalus Edw. N. ottoe Edw. A. lasus Edw. A. cithelus Edw. rhesus Edw. A. carus Edw. A. uncas Edw. A. yuma Edw. A. snowi Edw. A. nemorum Bd. sylvanoides Bd. agricola Bd. milo Edw. O. praticola Bd. versus Edw. campestris Bd. huron Edw. A. morrisonii Edw. A. phylæus Drury. chusca Edw. A. sabuleti Bd. manataqua Scud. vestris Bd. metacomet Harr. N. bellus Edw. A. deva Edw. A. ibnus Edw. A. pittacus Edw. A. python Edw. A. cestes Edw. A. modane Edw. phylace Edw. A. arabus Edw. A. nereus Edw. A. Amblyschirtes aenus Edw. A. simcon.

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A New Dissecting Dish.

A very convenient little dissecting dish for insects that was tried last term in the Entomological Laboratory consists of a cork bottom and paper sides.

To construct it a cork is selected of sufficient size to pin the insect to be dissected, fully stretched out. Around this is wrapped a strip of white paper to form the sides of the dish. The flare of the cork gives the right slant to the sides of the dish. The paper is secured to the cork by means of one or more pins. After it is pinned to the cork and trimmed to the right depth it is treated with melted wax or paraffine on the inside to fill up any holes in the cork or between the cork and the paper and to render the paper impervious to water.

The dissecting dish proves to be satisfactory in every particular.

—o—

The following courses in Entomology are given this term:

7. Elementary and Economic. twice a week.
8. Apiculture. twice a week.
11. Structural. 3 lectures a week,
12. Advanced Laboratory.

Eyes two
Last joint of antenna truncate ..... Cryptoglossa.
Last joint of antenna pointed ..... Centrioptera
Eyes four ..... Schizillus.
Labrum prominent, in great part visible
Intercoxal process of abdomen broad, truncate
Mentum large
Middle trochantin very small ..... Microschatia.
Middle trochantin very distinct ..... Asida.
Mentum small ..... Branchus.
Intercoxal process acute, triangular
Front tibiæ simple
Antenna nearly as long as the head and thorax .....
..... Coniontis.
Antenna very short ..... Cœlus.
Front tibiæ with the outer angle prolonged ..... Eusattus.
The third and fourth ventral segments of the abdomen with the hind edges leathery
Front entirely horny
Eyes less prominent than the sides of the front
Middle and hind tibiæ not dilated
The next to the last joint of the tarsi entire
Front coxæ rounded
Front feebly dilated at the sides
Tarsi spinose or setose beneath
Elytra widely embracing the body
Outer joints of antenna broader than the others
con.

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. 16. Berkeley California. Jan. 19 1895.

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Outline of an Elementary Course in Entomology.

In answer to inquiries concerning the general plan of presenting the subject to classes we give below outlines for two courses as suggestions.

A. To begin in the fall.

1st. week study legs and mouth parts of the grasshopper. 2d. week, the wing and the thorax structures. 3rd. week. the abdomen and a general review of external parts. 4th week, the internal anatomy of the grasshopper. 5th week, comparison of the external anatomy with that of the beetle. 6th. week, compare a butterfly. 7th. week. compare a wasp. 8th. begin determining to families. (using synopsis in Rep. Cal. Agr. Exp. Station for 1894.) 9th. week, continue the determination to family and begin the use of synopses such as occur in the POST CARD. 10th. week, begin the use of descriptions. Determination work may continue to the end of the term. The student in such a course will gain a general idea of the structure of insects and of their classification.

con.

EDWARDS W. H.

Revised Catalogue etc.

ius Edw- A. cassus Edw. A. nanno Edw. A. Pyrgus ericetorum Bd. oceanus Edw. A. domicella Erichs. A. tessellata Scud. caespitalis Bd scriptura Bd. Nisoniades brizo B.- L. icelus Lintn. A alpheus Edw. A. N. afranius Lintn. A. juvenalis Fabr. A. propertius Lintr. pacuvius Liutn. N. tatius Edw. A. cltius Edw. A funeralis Lintn tristis Bd. Systasea zampa Edw. A. Pholisora catullus Fabr. pirus Edw A. ceosa Edw. A libya Scud. Eudamus pylades Scud nevada Scud. A moschus Edw. A. hippalus Edw. A. brusius Edw. A. epigena Butl. A. cellus Bd - L. A. ityrus Fabr. simplicius Stoll A. albofasciatus Hew. A. Pyrrhopyga araxes Hew. A. Megathymus yuccae Riley A. neumoegenii Edw. A.

Front tarsi normal
Epipleuræ broader at base, attaining the humeral angle..... **Eleodes.**
Epipleuræ very narrow, not attaining the humeral angle..... **Embaphion.**
Front tarsi with the first joint short prolonged beneath in an angle..... **Trogoderes.**
Outer joints of antenna not broader than the others..... **Blaps.**
Elytra narrowly embracing the body
Head short..... **Eulabis.**
Head long
Outer angle of tibiæ prolonged.... **Cerenopus.**
Outer angle of tibiæ not prolonged. **Agoporis.**
Tarsi with coarse almost spinous hairs beneath
Intercoxal process of the abdomen broadly truncate
Posterior tarsi nearly as long as the tibiae..... **Amphidora.**
Posterior tarsi much shorter than the tibiae..... **Cratidus.**
Intercoxal process of the abdomen triangular, oval at tip..... **Stenotrichus.**
Tarsi silky pubescent beneath
Antenna shorter than the head and thorax
Epipleurae entire
Mentum with small lateral inflexed lobes..... **Nyctobates.**

con.

Advertisements will be accepted for this space at the prices given below.

This space is one inch.

One insertion	50 cts
Once a month	$ 5.00
Once a week	$ 20.00
Each issue for one year	$ 100.00

Attention is called to the peculiar value of THE ENTOMOLOGIST'S DAILY POST CARD for a certain class of advertising. It will reach particularly scientists teachers and horticulturists of the pacific coast.

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No. 17. Berkeley California. Jan. 21 1895.

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94.

BORN G. H.

The Coleoptera of Baja California.

Proc. Calif. Acad. of Science. 2d. Ser. Vol. IV. pp. 302 - 449.

Tetracha carolina Linn. Cicindela latesignata Lec. trifasciata Fabr. pusilla Say haemorrhagica Lec. hentzii Dej. A. L. praetextata Lec. A. L. lemniscata Lec. A. L. Calosoma prominens Lec. perigrinator Guer. Scarites subterraneus Fab. Schizogenius pluripunctatus Lec. depressus Lec. Clivina ferrea Lec. A. L. Panageus sallei Chd. A. L. Pachyteles testaceus Horn A. L. parca Lec. A. L. Morio georgiae Beauv. A. L. Bembidium mexicanum Dej. lugubre Lec. flavopictum Mots. A. L. nubiculosum con.

Outline of an Elementary Course in Entomology. (con.)

B. To begin in January.

1st. week study the legs of a number of insects comparatively. 2d. week, the physiology of walking. 3rd. week, the wings and flight. 4th. week, the structure of the thorax. 5th. week, head and mouth structures of a mandibulate insect. 6th. week, the head of a butterfly. 7th. week, the abdomen of a number of insects. 8th. week, the internal structure of insects. The following weeks determination work may be taken up as before.

The collection and mounting of insects should be a part of the work from the begining of the course. The student should be required to neatly arrange and label his collection.

Note books of unruled paper suitable for drawing should be used, everything observed should be drawn or rather sketched, for sketches containing the least number of lines are more useful for our purposes than finished drawings. Discourage the use of the eraser. The mistakes if allowed to stand aid in obtaining a better outline next time.

Mentum without lateral lobes....**Iphthimus.**
Epipleuræ not attaining the tips of the elytræ
Intercoxal process of abdomen broad, truncate.
..... **Cœlocnemis.**
Intercoxal process narrow and acute
Eyes broad ot the middle.....**Haplandrus.**
Eyes narrow at the middle
Mentum trilobed.....**Centronopus.**
Mentum rounded in front.....**Cibdelus.**
Antenna longer than the the head..**Rhinandrus.**
Tarsi coarsely pubescent beneath
Anuenna gradually thicker towards the tip
Epipleuræ entire..... .....**Tenebrio.**
Epipleuræ abbreviated
Head subquadrate.....**Bius.**
Head transverse... .....**Adelina.**
Antenna not thicker towards the tip
Mentum emarginate in front.... .....**Alæphus.**
Mentum truncate in front .....**Eupsolphus.**
Front broadly dilated at the sides
Four eyes
Front tibiae with outer apical angle obliquely truncate
Intercoxal process of abdomen triangular
Antenna long and slender.....**Mecysmus.**
Antenna stout
Upper eyes large, rounded.....**Blapstinus.**

con.

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No. 18. Berkeley California. Jan. 22 1895.

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University of California Entomological Society.

At the meeting of the society held the nineteenth of this month Prof F. L. Washburn of the Oregon State Agricultural College was elected a member.

Mr Killeen reported on the great abundance of Aphodius granarius Linn. of which he found several hundred in a plot of ground not more than two feet square and which last year yielded not more one or two in a place. Mr Rivers stated that it was his experience with this species that they were were always very abundant in wet years.

Mr. Bishop's observation of the presence of Œstris bovis Deg. elicited considerable discussion on parasites and parasitism in general. A most interesting point brought out was Mr. Rivers' experience with the fly in England where years ago he bred it from the dung of cattle presenting no trace of the characteristic warbles on the skin of the back.

Mr. Rivers exhibited our native species of the genus Clisiocampa in egg, larval and adult stages,

con.

Horn G. H. 94.

The Coleoptera etc.

Chd. dubitans Lec. Tachys corax Lec. A. L. corax Lec. audax Lec. Pterotychus protractus Lec. horni Lec subcordatus Lec. splendidulus Lec. Amara californica Dej. Calathus quadricollis Lec. Platynus hammeomarginatus Mann. extensicollis Say californicus Dej. cyanopis Bates A. L. funebris Lec maculicollis Lec. fossiger Dej. Anchonoderus apicalis Horn* L. Casnonia pensylvanica Linn. Tetragonoderus fasciatus Hald. Callidia rugicollis Horn* N. decora Esch. L. Lebia grandis Henrz. A. L. majuscula Chd. A. L. testacia Lec L. analis Dej. L. Apristus laticollis Lec. subcyaneus Horn* L. Plochionus timidus Hald. Pinacodera sulcipennis Horn L. remulcata con

Upper eyes small, linear.....**Conibius.**
Intercoxal process broad, truncate at tip.....
.....**Notibius.**
Front tibiæ with outer apical angle prolonged **Ulus.**
Two eyes.....**Cnemeplatia.**
No eyes.....**Aludes.**
Front coxæ subtransverse
Antenna with last two or three joints suddenly broader
Club of antenna three jointed.....**Tribolium.**
Club of antenna two jointed.....**Diœdus.**
Antenna gradually broader at tip
First joint of maxillary palpi oval...**Gnathocerus.**
First joint of maxillary palpi triangular
Epipleuræ entire
Front tibiæ slender
Femora mutic.....**Ulosonia.**
Femora toothed.....**Merotemnus.**
Front tibiæ more or less dilated
Prosternum prolonged.....**Mycotrogus.**
Prosternum not prolonged..**Aphanotus.**
Epipleurae abbreviated
Front tibiae slender
First joint of hind tarsi long.....**Cyanæus.**
First joint of hind tarsi short..**Metaclisa.**
Front tibiae broad, serrate
Next to the last joint of the tarsi bilobed.....**Anædus.**
All the tibiae more or less dilated

con.

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No. 19. Berkeley California. Jan. 23 1895.

QL 705 .C2 NTO

HORN G. H.

The Coleoptera etc.

Horn L. Apenes nebulo-a Lec A. L. Pentagonia picticornis Bates A. L. Brachynus lateralis Dej. fidelis Lec. A. L. tschernikhii Mann carinulatus Muls. Clenius cursor Chev. cumatilis Lec. leucoscelis Chev A. L. obsoletus Lec variabilipes Erch. tricolor Dej. A. L. Selenophorus pedicularis Dej. A. L. palliatus Fab. A. L. Stenolophus ochropezus Say Tachycellus nebulosus Lec L. nitidus Dej. Bradycellus rupresaris Say rivalis Lec cognatus Gyll. O. L. Anisotarsis flebilis Lec L. brevicollis Chd. A. L. mexicanus Dej. A. Anisodactylus consobrinus Lec porosis Mels. Chenidotus simplex Lec. Hydrocanthus tricolor Say. L. Hydrovatus major Shp. L. Canthydrus lineicon

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University of California Entomological Society.

con.

pointing out the distinguishing characteristics. He promises a synopsis of the group for an early number of the Post Card.

Mr. Wickson exhibited specimens of a very slender louse found quite abundantly on pigeons' clinging to the feathers.

Mr Woodworth exhibited an example of the San Jose scale and spoke of the work of a minute imported lady bird which attacks it. Considerable discussion followed on the reported failure of our Californian washes under the eastern conditions.

Next Meeting.

The next meeting of the U. C. Entomological Society will be held in the Entomological Laboratory Thursday, January 31st. at 3.45 P. M. Each member is expected to present an observation. All interested are invited to attend.

—o—

Prof C. V. Riley formerly U. S. Entomologist visited the University Monday. He is thinking seriously of making California his home.

Antenna gradually broader outwardly ..... **Phaleria.**
Outer four joints of the antenna abruptly wider. **Anæmia.**
Eyes more prominent than the sides of the front
Eyes emarginate infront
Body oval, pygidium covered
Fsrst joint of hind foot shorter than the second.....
..... **Diaperia.**
First joint of hind foot equal to the second.....
..... **Hoplocephala.**
First joint of hind foot longer than the second
Intercoxal process acute..... **Platybema.**
Intercoxal process truncate..... **Scaphidema.**
Body cylindrical, pygidium exposed..... **Hypophlœus.**
Eyes not emarginate..... **Pentaphyllus.**
Front with a leathery margin, or a leathery band between it and the labrum.
Antenna slender, not broader towards the tip.... **Apocraphy.**
Antenna broader towards the tip ..... **Helops.**

To the above table the following additions and corrections should be made: The name Adelina should be replaced by Doliema. Four genera omitted from the table are:

Emmenastrichus only differing from Emmenastut in being hairy.

Dilopines resembling Doliema but with the clypeus arcuate.

Echocerus differing from Gnathocerus in having a vertical tooth on the mandible.

Alphitobius similar to Aphanotus but with the front tibiæ somewhat denticulate.

Two genera Cœlomorpha and Trichoton we cannot now place.

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A Californian Journal of Entomology.

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THE ENTOMOLOGIST'S DAILY POST CARD.

Post Card Pub. Co. 2043 Lincoln St.
Subscription $2.00 per year.
Advertisements 50 cts per inch.

No. 20. Berkeley California. Jan. 24 1895.

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HORN G. H.

The Coleoptera etc.

atus Horn L. Laccophilus decipiens Lec. pictus Lap. L. terminalis Shp. Desmopachria dispersa Cr. A. L. Bidessus cinctellus Lec. affinis Say amandus Lec. Hydroporus funereus Cr. L. addendus Cr. A. L. vilis Lec. Columbus medialis Lec. Deronectes striatellus Lec. Copelatus chevrolatii Aube L. Hydrosoma regularis Lec. Eretes sticticus Linn. Rhantus atricolor Aube A. L. flavogriseus Cr. binotatus Harr. Hydaticus stagnalis Fab. Ther-monectes marmoratus Hope A. peninsularis Horn* L. Megadytes fraternus Shp. L. Cybister ellipticus Lec. Dineutes sublineatus Aube A. L. Gyrinus plicifer Lec. parcus Lec. L. Helophorus obscurus Lec. Epimetopus cofatus Lec. L.

con.

Hints for Teachers.

SCALE INSECTS by M. W. T.

The structure of scale insects cannot be studied in detail without the aid of a compound microscope but their habits and general character can easily be observed with the naked eye. Scales easily obtainable at almost any season of the year are the black scale, the brown apricot scale found also on peach, locust, and oak; the white rose scale, found also on blackberry; the soft yellow scale, found on orange, lemon and ivy; and the greedy scale which may infest almost any plant These represent the two common types of scales, viz: those that have a covering made up of a secretion from the insect and concealing it, as in the rose and greedy scales, and those that have the insect naked upon the plant as the black scale the brown apricot scale, and the yellow orange scale.

Points to be developed. No apparent separation into three parts Adults fixed upon the plants, Young crawl around moult skin, become adults, lay eggs and then die. Mouth parts

con.

Triorophus.	Tenebrionidæ.	Coleoptera.
Thorax transverse		**punctatus**, Lec.
Thorax quadrate		
Elytra shining		**lævis**, Lec.
Elytra opaque, pubescent		**subpubescens**, Horn.

Notes for Beginners — No. 1.

The use of the synopses. — We will suppose the insect in hand to be one of the commonest of our bumble bees Bombus californicus. Turning to the synopsis of this group in the first issue of the Post Card we read "Thorax all yellow above" and looking down we see with the same amount of indentation the words "Thorax black and yellow above." Our specimen belongs to the second category. Looking therefore under the second heading we find two alternatives based upon the color of the tip of the abdomen. The first of these fits our specimen and our search is now limited to the five species included under that head. Three alternatives now present themselves and the species is distinguished from the others by the peculiar coloring of the abdomen.

The determination of any insect is accomplished in the same manner. All the alternatives should be read at each step before the decision is made on that point. The best results are obtained when a considerable number of closely related insects are studied at the same time.

Thorax. — This term is used to designate the middle one of the three principal regions of the body. Accurately it includes the three segments bearing the legs and including these appendages. In descriptive entomology however the legs and wings are rarely included and very often only the conspicuous side as the back is meant. In beetles it is commonly only the back of the first joint.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

Organ of the U. C. Ent. Society

THE ENTOMOLOGIST'S DAILY POST CARD.

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Advertisements 50 cts per inch.

No. 21. Berkeley California. Jan. 25 1895.

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HORN G. H.

The Coleoptera etc.

94.

Ochthebius interruptus Lec. A. I., Hydrophilus insularis Cast. Tropisternus limbalis Lec. lateralis Fab. L. ellypticus Lec. californicus Lec. nitens Cast. L. apicipalpis Chev. Hydrocharis glaucus Lec Berosus rugulosus Horn. A. I. miles Lec. Lacoobius ellypticus Lec Philhydrus nebulosus Say Helochares normatus Lec. Cymbiodyta dorsalis Mots. Creniphilus infuscatus Mots suturalis Lec L. Phænonotum extriatum Say L. Silpha ramosa Say Maseochara valida Lec Alæochara nitida Grav. sulcicollis Mann Staphylinus saphyrinus Lec, lucanus Horn* L. Xanthopygus cacti Horn. A. L. Belonuchus ephippiatus Say A. I., xanthomelas Solsky. A. I., Philonthus flavocon.

Hints for Teachers.

SCALE INSECTS con. by M. W. T. consist of a sucking tube, or beak through which the insect sucks the sap from the plant.

Importance of a knowledge of these insects in California. Destroyed by spraying, by fumigating and by the use of parasites.

—o—

The Accessions Catalogue.

Of all the records kept of a collection none are as useful as the accession catalogue. Books may specially ruled for this purpose but they are too expensive for the ordinary collector. The common blank books with Journal rulings serve as well as any specially ruled book we have ever seen. The columns are used as follows: First column accessions number, narrow column initial or other reference to collector, then in the broad column the name or description of the collection. The remaining columns of that page may be used for references to notes. The entry is continued on the opposite page, the first column for locality, the second for date of collection if different from that of entry. Then comes remarks and finally cross-refereneces.

Lateral margin of elytra distinct
Epipleuræ occupying all the inflexed portion of the elytra.....
.....**robustus**, Lec.
Epipleuræ narrow, suddenly broader at base
Prosternum distinctly margined at tip.....**costatus**, Horn. L
Prosternum not margined at tip
Elytra with faint costæ and intermediate reticulations.....
.....**reticulatus**, Lec. A.
Elytra coarsely irregularly eroded.....**erosrs**, Horn L.
Elytra not margined
Prosternum margined at tip
Elytra with fine scale-like hairs.....**puberulus**, Lec.
Elytra without hairs or scaies
Side margins of the thorax explanate and ciliate.....
.....**ciliatus**, Horn. L.
Side margin of the thorax not explanate nor ciliate
Prosternum broad, punctured a tip.....**sectus**, Horn. L.
Prosternum narrow, smooth at tip.....**politus**, Horn
Prosternum not margined at tip
Epipleurae suddenly broader at base .....**lævis**, Lec
Epipleurae gradually broader toward the base
Epipleurae smooth
Form oblong.....**dubius**, Lec.
Form oval.....**sculptus**. Champ L.
Epipleurae punctate and hairy
Form oblong.....**productus**. Lec. A. L.
Form oval

con.

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A CALIFORNIAN
OURNAL OF
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. C. Ent. Society

THE ENTOMOLOGIST'S
DAILY POST CARD.

Post Card Pub. Co.
2043 Lincoln St.
Subscription
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Advertisements
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No. 22. Berkeley California. Jan. 26 1895.

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HORN G. H. 94.

The Coleoptera etc.

limbatus Erichs. A. L. politus Linn instabilis Horn alumnus Erichs. A. L. quadrulus Horn A. L. Actobius pæderoides Lec. elegantulus Horn Cafius sulcicollis Lec. opacus Lec Xantholinus cephalus Say Ste rus luculentus Cas. Cryptobium arizonense Horn A L. Lathrobium lituarium Lec A. L. Stilicus tristis Mels. A L Paederus femoralis Lec. grandis Aust. L. Platystetnus americanus Erichs Scaphisoma apicale Horn* L. peninsulare Horn*L. Phalacrus ovalis Lec Stilbus obtusi Lec. Sacium amabile Lec. A. L. Megilla maculata Deg. Hippodamia convergens Guer. Cycloneda sanguinea Linn. abdomenalis Say occulata Fab. Thalassa Montezuma Muls L. Hycon

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Cover-glass Mounts.

Attention has often been called to the advantages of mounting microscopical preparations between two covers instead of on a slide in the usual manner.

The advantage is chiefly in the oppertunity it gives of examining the object from both sides. To this may be added the saving in cost of the glass, the ability of storing the preparations in small compass and the lessening of the danger of breakage by dropping

The objections are the difficulty of manipulation on the stage of the microscope, the exudation of the mounting fluid when handling, the danger of breaking in the fingers, and the absence in the market of any suitable means for storing.

There will be presented in an early issue of the Post Card a plan which will overcome the last objection in a great measure. The danger of breaking will depend in great measure on the individual but will generally be less than the danger of dropping. The preparations must be thoroughly dried and there will be no exudation. A metal slide can be easily made to hold the covers.

Thorax either smooth or with minute scattered granules ..... **muricatus,** Lec.

Thorax distinctly punctate..... **difficilis,** Lec

Notes for Beginners. No. 2.

The order of segments. — The terms first, second, third, etc. s applied to parts of insects vary a little in their significance, gener- lly the appendages and the segments of the body are numbered rom the head end backward. Some few authors in case the first egment of the abdomen is very small and inconspicuous, begin at he second joint calling it first. The joints of the appendages are ounted from the body outward. The veins of the wings are gener- lly counted from the front edge backwards though among Lepidop- era it is quite customary to count in the opposite direction.

Scutellum. — Each segment of the thorax above is theoretical- y divided into four regions, the præscutum, the scutum, the scutel- um, and the postscutellum, The first and last of these are general- y very small and often almost indistinguishable The scutellum is herefore ordinarily the second and smaller of the two principal di- isions of the back of a thoracic segment. In descriptive entomology he term is almost always limited to the scutellum of the mesotho- ax. In Coleoptera and Hemiptera it is the triangular piece between he wing covers that is indicated.

Dentation of tibiæ. — In the second synopsis there occurs the erms tibiæ bidentate and tridentate. The word dentate means oothed and refers to the tooth-like projections on the out side, i. e. n the side furtherest from the thigh when the leg is bent. The tib- a itself may be known by the elbow-like joint by which it is united ith the femur or thigh.

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ADVERTISEMENTS.

A Californian Journal of Entomology.

Organ of the U. C. Ent. Society

The Entomologist's Daily Post Card.

Post Card Pub. Co. 2043 Lincoln St.

Subscription $2.00 per year.

Advertisements 50 cts per inch.

No. 23. Berkeley California. Jan. 28 1895.

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Lady Birds vs. Black Scale.

Inquiries are constantly coming to hand in reference to the lady birds imported from Australia to destroy the black scale.

These insects are in the care of the State Board of Horticulture who have distributed large numbers of them over the State to all who have applied. It appears however that except in a very few instances the lady birds disappeared almost immediately.

The lady birds certainly feed on the black scale and are able to live and multiply rapidly in California as the experience at Mr. Cooper's place in Santa Barbara abundantly prove.

The problem of making the insects a practical success is very far from being solved. There is no ground for discarding at present the use of the usual washes. On the other hand the experiments with the lady birds should be continued and every fruit grower in the State should hold himself ready to second the earnest efforts of the State Board.

We can not hope to ever obtain results comparable with those obtained with the Vedalia but still we can expect good results.

The Coleoptera etc.

HORN G. H.

perasplis undulata Say Psyllobora tedata Lec Epilachna corrupta Muls. A. L. Langurites lineatus Lec A. L. Ditoma sulcata Lec. A. L. Sosylus dentiger Horn L. Silvanus surinamensis Linn. Cathartus advena Waltl. Scalidia linearis Lec. A. L. Lamophlaeus cephalotes Lec Typhoea fumata Linn. Litargus balteatus Lec. Bergimus pumilus Lec. Dermestes vulpinus Fab Trichii Kug. L mannerheimii Lec. Attagenus hornii Jayne Trogoderma sternale Jayne ornatum Say Cryptorhopalum haemorrhoidale Lec. A. L, Anthrenus scrophulariae Holoplepta yucateca Mars Hister lucanus Horn Paromalus consors Lec Saprinus behrensii Horn placidus Erichs. A. L. fimbricon

94.

Elytra very broadly oval
Front tibiae broad
Color dark brown or black. ..... **puberulus**, Lec.
Head and thorax reddish..... **puncticollis**, Lec
Front tibiae narrow ..... **gagates**, Horn, A.
Elytra elongate oval or sub-parallel
Front tibiae of the males subangulate at middle, arcuate beneath
..... **granulatus**. Lec.
Front tibiae of the males suddenly narrower at base.....
..... **sulcatur**. Lec.
Front tibiae alike in both sexes
All the lateral margin of the elytra visible from above.....
..... **reflexus**, Horn L.
All the lateral margin of the elytra not visible from above
Elytral intervals acutely costate ... **costipennis**, Horn L.
Elytral intervals not costate ..... **opacus** Lec. A. L.

Card Triangles for Mounting Small Insects.

Many insects are too small to be satisfactorily pinned and even if they will take one of the finer sizes of insect pins most collectors prefer to use a coarser pin and a triangle. The paper used is preferably a very heavy ledger paper cut in strips a quarter or a third of an inch wide and from these the small isosoles triangles are cut. The base of the triangle should be as small as can be and be strong on the pin. Mr. Fuchs of San Francisco who does wonderfully fine mounting of this kind uses triangles of less than a sixteenth of an inch base. He uses a metal guide for putting the pins in the triangles which contains a hole of such size and depth that the paper con.

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Subscription $2.00 per year.

Advertisements 50 cts per inch.

No. 24. Berkeley California. Jan. 29 1895.

95.705 ENTD

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94.

HORN G. H.

The Coleoptera etc.

atus Lec, lubricus Lec opacus Horn* L. vitiosus Lec. L. bigemmeus Lec lugens Erichs, Teretrius levatus Horn* L. Cercus sericans Lec. Conotelus mexicanus Murr. Carpophilus pallipennis Say Stelidota geminata Say L. strigosa Sch. L. Prometopia sexmaculata Say L. Lobiopa undulata Say A. I Corticaria moro-a Lec Trogosita virescens Fab. barbata Lec L. Tenebrioides mauritanica Linn Alindria teres Mels. Limonichus nebulosus Lec. Psenephenus haldemanni Horn L. Dryops productus Lec. Elmis abnormis Horn A. L. similis Horn A. L. Anorus piceus Lec Yesperoctenus flohri Bates L. Meristhus cristatus Horn L. Chalcolepidius rubripennis Lec. L. Cardiophorcon.

Card Triangles for Mounting Small Insects. (con.)

may be pushed to exactly its proper place on the pin while the latter is constantly held at right angles to the triangle. Whether such a guide is used or not one should strive to have the paper firm on the pin which requires care in the process of pinning.

The insect is fastened to the point of the triangle with its right side toward the pin. The common fish glue is excellent for this purpose but some prefer to use shellac dissolved in alcohol.

The paper should touch the insect on the thorax just above the legs. It is often desirable to bend the tip of the triangle where it touches the body so as to fit more closely to it. The body should always be level and balanced in a natural position

—o—

University of California Entomological Society.

There will be a meeting of the Society in the Entomological Laboratory Thursday January 31 at 3.45 P.M. Each member will be expected to present an observation. Any one interested is invited to attend.

Mentum trilobed
Front feet entirely spinous beneath in both sexes
Spurs of front tibiæ unequal
Front femora mutic in both sexes
Elytra shining
Punctures forming striæ..... **carbonaria.** Say A
Punctures scattered..... **quadricollis.** Esch.
Elytra opaque..... **humeralis.** Lec.
Front femora armed in the male
Tooth very obtuse..... **granulata.** Lec.
Tooth very acute..... **extricata.** Say.
Spurs of front tibiæ equal
Thorax smooth
All the femora toothed
Teeth of femora acute
Front angles of the thorax acute but not tooth-like...
..... **militaris.** Horn L.
Front angles of the thorax tooth-like... **armata.** Lec.
Teeth of femora obtuse..... **femorata.** Lec.
None of the femora toothed except sometimes the front femora
Thorax sub-quadrate
Elytra not striate
Thorax elongate..... **longicollis.** Lec. A.
Thorax square..... **gentilis.** Lec.
Elytra striate
Front femora toothed

con

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No. 25. Berkeley California. Jan. 30 1895.

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94.
HORN G. H.

The Coleoptera etc.

us elwardsii Horn tenebrosus Lec. Hoistonotus simplex Lec. Esthesopus dispersus Horn Aptopus peregrinus Horn L. Cryptolhppnus ornatus Lec pectoralis Say Monocrepidius sordidus Lec Dicreyidius corvinus Cand. Anchastus bicolor Ischiodontus ferreus Lec. A. L. soleatus Say L. Ludius texanus Lec A. L. Melanotus cribricollis Cand. Dolpius lateralis Esch Epiconyx pullatus Horn A. L. Plastocerus schaumii Gyascutus obliteratus Lec Anthaxia cnerogaster Lap Chrysobothris edwardsii Horn A. L. acutipennis Chev A. L. purpure•vittata Horn. A. L. lixa Horn luema Horn* L. bicolor Horn*L. Polycesta velasco L. & G. A. L. Acmaeodera flavonarginata Gray con

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Zoological Meeting.

At the regular meeting of the Zoological section of the Science Association of the University held last evening Prof. Johnson read a paper on the "Inadequacy of the Cell Theory." He called attention to the wonderful complexity of structure of many of the organs and organisms commonly regarded as unicellular, and the parallelism often observable in the structural and functional differentiation in multicellular and unicellular structures.

On the other hand distinctly multicellular structures often behave in a way indicating a peculiarly intimate relationship of the cells, quite as though they were but parts of the same cell.

Further, In many cases, notably in insect and vertebrate embryos it becomes impossible to distinguish cell boundaries and we have only theoretical reasons for considering mans structures multicellular.

Indeed there is at present no definable unit of organic structure for every item of cell characteristics fails to be applictble somewhere in the animal kingdom.

Thorax deeply emarginate in front **lucæ.** Lec. L.
Thorax feebly emarginate in front
gracilis. Lec. A. L.
Front femora sinuate near the tip
innocens. Lec. L.
Sides of thorax strongly rounded
Humeral angles of elytra indistinct or wanting
Front femora armed **grandicollis.** Lec.
Front femora mutic **gigantea.** Lec.
Humeral angles of elytra always evident
Front femora mutic in both sexes **nigrina.** Lec. O.
Front femora armed, at least in the female
Thorax with sides gradually narrowing to base
hispilabris. Say O. A.
Thorax strongly constricted at base
Thorax at least a half broader than long
acuticauda. Lec.
Thorax but little broader than long
dentipes Esch
Thorax rugose
Elytra shining **hirsuta.** Lec.
Elytra opaque
Elytra with rows of elevated tubercles **granosa.** Lec.
Elytra sub-striate, with strongly muricate punctures
pilosa. Horn
Front feet with the first two or three joints either with silken or with spongy pubescence

con.

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No. 26. Berkeley California. Jan. 31 1895.

(10. ENTO.

The Use of Arsenites in Bordeaux Mixture.

Prof. Gillette of the Colorado Agricultural Experiment Station first called attention to the possibility of applying an arsenite as Paris green in Bordeaux mixture with even greater safety to the plant than when applied alone, and thus save the cost of one application.

This plan has been very generally adopted especially in the eastern States and has been recommended by many of the Experiment Stations, all pronouncing it thoroughly effectual both as an insecticide and a fungicide.

Now and then we hear adverse reports as to its value either in one or the other of these particulars These are not however more common than complaints against either remedy separately, so we may conclude the practice sound

It is altogether probable, though it has not been proven by experiment that the insecticidal value of the Paris green is diminished, and as it can be safely done, it would be advisable to considerably increase the proportions of the poison.

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The Coleoptera etc.

A. L. flavosticta Horn sabbalteata Lec. L. scapularis Horn* L. stigmata Horn* L. stigmata Horn* A. L. clausa Horn* L. insignis Horn* L. Agrilus inseptus Horn* L. niveiventris Horn felix Horn A. L. lacustri Lec. A. L. addendus Crotch A L. Lycus cruentus Lec. A. L. Plateros sanguinicollis Horn* L. Pyropyga fenestralis Mels. Microphotus dilatatus Lec. A. L. Cenophengus debilis Lec. Telephorus decipiens Horn* L. Collops validus Horn L. vittatus Lec A. L. marginicollis Lec Attalus cinctus Lec. N. A. basalis Lec L. difficilis Lec setosus Horn* L. unicolor Horn* L. Pristocelis sordidus Lec. tejonicus Lec. antennatus Mots. A. L. convergens Lec A. L. brevicornis con.

Front feet of males not dilated
Thorax feebly constricted at base
Base of thorax rounded..... **scabripennis.** Lec.
Base of thorax truncate
Terminal joints of antenna somewhat club-like but not flattened ..... **clavicornis.** Esch.
Terminal joints of antenna flattened
Elytra more or less shining..... **consobrina.** Lec.
Elytra very opaque..... **tenebrosa** Horn
Thorax very strongly constricted at base
Thorax smooth..... **parvicollis.** Esch.
Thorax rugose
Elytra with coarse punctures and intermediate elevations..... **cordata.** Esch.
Elytra simply with smooth tubercles..... **pimelioides.** Mann. O.
At least the first joint of the foot of the male dilated..... **subnitens.** Lec A.
Mentum not at all trilobed
Front femora of the female mutic..... **marginata.** Esch.
Front femora of the female armed..... **scabricula.** Lec.

Cutworms and Grass.

There is certainly some relationship between cutworms and grass. Grassy places are almost always infested and more abundantly than elsewhere but it is the injury to plants in barefields that causes most complaint. The explanation appears to be that the grass attracts the moths and so is badly infested but really protects the plant.

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No. 27. Berkeley California. Feb. 1 1895.

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HORN G. H.

The Coleoptera etc.

Lec fulvotarsis Bld Dolichosoma nigricorne Bland A. L. Isaytes pusillus Lec. Eschatocrepis constrictus Lec Tillus occidentalis Ghm. A. L. Cymatodera punctata Lec. oblita Horn N. A. L. punctipollis Bland xanti Horn L. fasciifera Lec purpuricollis Horn* L. Aulicus nec. Spin. Trogoderma on edwardsii Horn A. L. Trichodes peninsularis Horn* L. Clerus quadrisignatus Say A. L. Hydnocera omogera Horn* L. Orthopleura dauicornis Fab. L. Lebasiella janthina Lec. L. Corynetes rufipes Fab Ptinus interruptus Lec. pygmaeus Gorh Sitodrepa panicea Linn. Trichodesma sellata Horn* L. Hadrobregmus pumilio Lec L. Eupactus pudicus Boh. L. Xyletinus pallicorn.

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Care of Cover-glass Mounts.

We have recently adopted a very simple and compact method of preserving cover-glass preparations. It consists of books of the same size as the slides and fitting in to the ordinary slide box. The common twenty five slide box may in this way by made to contain from four to six hundred preparations.

The book is made in the following manner; For cover use tag paper such as this paper is printed on cut to the size of two by three inches. The leaves may be of a good quality of flat cap or writing paper. They should be cut two and one half inches square, and will be when bound in the book a quarter inch shorter at both ends than the cover, and a quarter inch wider. This quarter inch in the width of the pages is folded back so the book becomes just one by three inches.

A small slit is cut for each cover in such a position that the cover when placed in it will be held by the folded edge of the page

Two or three preparations may be put on a page and the data usually put on the slide may be written in the book.

Syrphidæ. **Diptera.**

Antenna with a terminal style..... **Ceria.**
Antenna with a dorsal bristle
Marginal cell open
Anterior cross vein distinctly before the middle of the discal cell
Antenna elongate
Dorsum of thorax with yellow lateral stripes..... **Chrysotoxum.**
Dorsum of thorax without yellow lateral stripes
A stump of vein in first posterior cell from the third longitudinal vein..... **Microdon.**
No such projecting stump
Epistoma receding ..... **Paragus.**
Epistoma projecting..... **Chrysogaster.** pt.
Antenna short
Face black in ground color
Abdomen with only four visible segments **Nausigaster.**
Abdomen with more than four visible segments
Hind femora thickened ..... **Myiolepta.**
Hind femora not thickened
Epistoma projecting ..... **Chrysogaster.** pt.
Epistoma not projecting
Abdomen without markings..... **Chilosia.**
Abdomen with markings
First joint of the front foot of the male slender... **Melanosoma.**
First joint of the front foot of the male much con.

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No. 28. Berkeley California. Feb. 2 1895.

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The Coleoptera etc.

idus Lec. L. Lasioderma dermestinum Lec. L. Hemiptychus obsoletus Lec. L. estriatus Horn* L. Amphicerus punctipennis Lec fortis Lec. Sionoxylon quadrispinosum Lec A. L. dinoderoides Horn A. L. sericans Lec Dinoderus truncatus Horn Polycaon punctatus Lec. L. exesus Lec. L. lyctus planicollis Lec californicus Casey Ceracis similis Horn* L. Rhipidandrus peninsularis Horn* L. Eurysphindus hirtus Lec. L. Canthon punctieollis Lec. A. L. simplex Lec. obliquus Horn* L. Aphodius granarius linn Ataenius lucanus Horn. L. strigatus Say. L. desertus Horn gracilis Mels. L. lobatus Horn L. texanus Harold A. L. Psammodius nanus Dej. L. Bradycinetus serracon

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An Entomological Game.

Nothing serves so well to fix in the minds of the young the dry details like names as does the use of them in games. The game of authors is an example.

Any number of such games might be devised. The one we will suggest is a set of cards suitable for playing any of the ordinary games usually played with cards

Select four insects as for instance the common yellow jacket, the large red butterfly, the harlecabage bug, and a red winged grasshopper. These correspond with the four suites in cards.

Thirteen cards are devoted to figures of each insect and with the ordinary playing cards thus:

Ace	The food of the adult.
King	The egg.
Queen	The young.
Jack	The adult.
Ten spot	The head.
Nine spot	The thorax.
Eight spot	The abdomen.
Seven spot	The antenna.
Six spot	The front leg.
Five spot	The front wing.
Four spot	The middle leg.
Three spot	The hind wing.
Two spot	The hind leg.

broadened ....**Platychirus.**

Face more or less yellow in ground color

Dorsum of thorax with yellow lateral stripes

Dorsum of thorax with median ashy line **Mesograpta.**

Dorsum of thorax without such line

Fourth abdominal segment with two median yellow stripes and an oblique side spot .....**Allograpta.**

Fourth abdominal segment not so marked... ... . **Sphærophoria.**

Dorsum of thorax without yellow lateral stripes

Abdomen club-shaped or spatulate

Hind femora slender..... ..... **Baccha.**

Hind femora thickened

Third joint of antenna nearly globular. **Sphegina.**

Third joint of antenna nearly twice as long as broad..... .....**Neoascia.**

Abdomen oval or slender

Abdomen with distinct yellow cross-bands, interrupted or entire

Sixth abdominal segment of male cylindricle, as long at the two preceding. Fifth segment of female one half as long as the preceding..... ....**Eupeodes.**

Sixth abdominal segment of male normal. Fifth segment of female a third or a fourth as long as the preceding

Face very convex..... .....**Catabomba.**

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The Coleoptera etc.

tus Lec. A. L. Trox foveicollis Harold A. L. suberosus Fab. pa tatus Germ. A. L. (Glaresis mendica Horn A. L. Chauranthus discolor Burm. 1. Oncerus convergens Horn* L. Dichelonycha picea Horn* 1. pusilla Lec Serica mixta Lec pilifera Horn* L Diplotaxis punctulata Horn* L. morens Lec tristis Kby L. angularis Lec. A. L. tenuis Lec. Lachnosterna maculicollis Lec L. nitidula Lec L. Listrochelus puberulus Lec. L. densicollis Lec. L. mucoreus Lec obtusus Lec. A. L. carminator Horn* L. Anomala centralis Lec. A. L. Pelidnota lucæ Lec. L. Cotalpa ursina Horn L. Cyclocephala dimidiata Burm. longula Lec. immaculata Burm. Ligyrus gibbosus Cecl. 60.

An All-purpose Net.

There is no doubt but that a special net for each kind of collecting will give the best results, but while the net becomes better suited to one purpose it becomes at the same time less suited to other purposes. A specialist will adopt a special net, but an ordinary collector will want an all-purpose net even if not quite the best for each insect.

The net we have found to meet best the requirements of an all-purpose net is one consisting of a strong but light brass hoop about a foot in diameter, soldered firmly into the end of a brass or tin ferrule. This ferrule should be about six inches long to serve as a handle when beating, when long handle is removed.

The bag of the net shold be of strong but light cloth as a good muslin or swiss. It should be about two feet deep, and taper gradually from the mouth to the bostom where it should be two or three inches wide. This will enable one to easily remove an insect with the cyanide bottle or with the hand, and facilitates the clearing of the net by reversing it.

Face slightly convex
Third longitudinal vein with a distinct curvature into the first posterior cell ..... **Didea.**
Third longitudinal vein straight or gently curved..... **Syrphus.**
Abdomen without definite yellow cross-bands
Hind femora thickened ..... **Brachomyopa.**
Hind femora slender ..... **Chiosia**
Anterior cross-vein ending near or beyond the middle of the discal cell
Arista plumose..... **Serricomyia.**
Arista bare
Third longitudinal vein bent deeply into the first posterior
Third joint of antenna broad..... **Triodonsa.**
Third joint of antenna oval..... **Helophilus.**
Third longitudinal vein only gently curved
Abdomen spatulate or club-shaped..... **Baccha.** pt.
Abdomen in no wise club-shaped
Thorax with distinct yellow markings other than at the humeri..... **Sphecomyia.**
Thorax with no yellow except at the humeri
Abdomen nearly bare ..... **Xylota.**
Abdomen pilose
Thorax with bristles ..... **Ch / chlamys.**
Thorax without bristles
Abdomen elongate..... **Brachypalpus.**
Abdomen oval

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Lamp Chimneys for Breeding Cages.

Now that the insect season is opening it will be opportune to give some attention to the methods of rearing larvæ.

The common lamp chimney makes an excellent cage for this purpose and one which commends itself by its cheapness as well as by its convenience.

If the larva is to be reared on a small potted plant, the lamp chimney is placed over it and is pressed down into the earth in the pot.

The top may be closed by tying over it a piece of muslin. A watch glass just large enough to lie within the top makes a very neat method. Lantern globes, which may be used in the same way may be closed by inverting tumblers over them.

Potted plants are not always available when the insects must be fed on leaves or stems. These may be kept fresh by putting the stems in water. A cork just fitting the bottom of the chimney is bored so as to hold a homeopathic vial for the water produces a suitable adaptation of this form of cage.

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The Coleoptera etc.

pugionatus Lec. A. L. bryanti Rivers L. Megasoma thersites Lec. L. Ibiturus illatus Lec. A. L. Euphoria tasciferа Lec. L. Cremastochilus wheeleri Lec. pilosicollis Horn Lec. A. L. Euphoria tasciferа Lec. L. Cremastochilus wheeleri Lec. pilosicollis Horn erinitus Lec. opaculus Horn* L. Mallodon nolarium Bates L. mandibulata Gemm Lec. A. L. Chaphalodes tachyderoides Thoms. L. Hammatocherus Thoms. L. Eburia Deobrachus geminatus Lec. A. L. Achryson surinamum Linn. L. Osmidus guttatus Lec. A. L. Chaphalodes tachyderoides Thoms. L. Hammatocherus Thoms. L. Eburia Lec. A. L. Chaphalodes tachyderoides Thoms. L. Hammatocherus Thoms. L. Anoplus prolixus Wilkei Bland. L. conspersa Horn* L. Elaphidion punctatum Lec. L. Anoplus prolixus Wilkei Bland. L. conspersa Horn* L. Elaphidion punctatum Lec. L. Anoplus prolixus Lec. L. protensis Lec. A. L. volitans Lec. L. Eustroma validum Lec. Compsa punctiollis Lec. L. quadriplagiata Lec. L. Python discoideum Lec. L. Rhopalophora

Hind femora with spines below . . . . **Crioprora.**

Hind femora without spines below **Criorhina.**

Marginal cell closed and peteolate

Third longitudinal vein bent deeply into the first posterior cell . . . . . **Eristalis.**

Third longitudinal vein not deeply bent into the first posterior cell

Arista feathery plumose . . . . . **Volucella.**

Arista densely plumose, appearing like a solid mass . . . . . **Copestylum.**

The flies belonging to this family may be distinguished from all others by the presence of the spurious vein. The family is of particular interest from the fact that many of them prey upon plant lice as larvæ. Breeding experiments with our native species should be conducted, for the life histories of very few species are known.

Notes for Beginners. No. 3.

Face. — The head from the mouth to an imaginary line connecting the eyes is called the face. It is not a sharply defined region but is generally so used as not to raise the question of boundary. When the head makes a decided bend this is considered the division between face and crown.

Clypeus. — This is the most prominent portion of the face. It is nearly always marked off from the rest of the face by distinct sutures.

Labrum. — The labrum forms the upper lip of the insect. It is attached to the end of clypeus and unlike the labium or lower lip consists of a single piece.

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rugicollis Lec. L. Acyphaderes deliratus Horn* L. Callichroma cobaltinum Lec. L. Dendrobius mandibularis Serv. A. L. Dissonotus multilasciatus Dup. L. Stenaspis solitaria Say A. L. Tragidion annulatum Lec L. Oxoplus marginatus Lec. L. cruentatus Lec. L. Sphenotheres basalis Horn* L. [illegible] Horn L. Cyllene antennatus White. A. L. Rhopalopachys irroratus Lec A. L. Enderes parallelus Lec. L. Atimia dorsalis Lec. Acmaeops falsa Lec. Opistomis neutralis Horn* Leptura sexspilota Lec. Monilema semipunctatum Lec. L. Spoliatum Horn L. subrugosum Bland. L. Ptychodes trilineatus Linn. L. Acanthoderes perinsularis Horn L. Liopus crassulus Lec. L. (15. [illegible] 94.

Agriculture 13.

The above is the official designation of the Seminary course in Agriculture at the University of California. The course is for the study of current agricultural literature. The assignment for next week being entomological will be of some interest to readers of the Post Card.

1. The eastern occurence of the San Jose scale. L. O. Howard. Insect life Vol. 7. page 153.

2 The San Jose scale in New Jersey. J. B. Smith, Bulletin 106 N. J. Experiment Station.

3. Mealy bugs and their allies. G. C. Davis. Insect Life l.c. p. 168.

4. The horn fly, G. H. Perkins, 7th. Report Vt. Station p. 126.

5. The apple maggot G. H. Perkins. l.c. p. 139.

6 The cabbage root maggot. M. V. Slingerland, Bulletin 78. Cornell Station.

7. Observations on the application of fungicides and insecticides. Bulletin 74. N. Y. Station

8. Some observations on new and old insecticides and their combination with fungicides. R. T Galloway, Insect Life p. 126.

9. The contagious diseases of the chinch bug, S. A. Forbes, Report Ill. Nat. Hist. '94 p. 26.

Eyes pilose

Pile on back of thorax light colored..... **baroni,** Willis.

Pile on back of thorax black..... **occidentalis,** Willis.

Eyes dark

Scutellum with bristles on its margin

Legs in a large part yellowish..... **pallipes,** Willis.

Legs black except a small spot at the knees **lugubris,** Willis

Scutellum without bristles on its margin

Legs black..... **nigripennis,** Willis. ♂

Legs reddish yellow..... **parva,** Willis ♂.

Notes for Beginners. No. 4.

Antenna. — The antennæ are the most conspicuous appendages of the head. There are always two situated on the face or crown. They present in different insects a wide range of structure. The basal joint, scape, and the second joint, pedicel, are generally distinguishable from the remaining portion, the flagellum. Among flies the third joint is wonderfully enlarged. In this case the remaining joints are called the style if heavy, and the arista if as is usually the case they are slender and bristle-like. In many insects the outer joints are enlarged making the antenna club-like. Some are elbowed or bent abruptly at about the middle. Sometimes the joints have long projections producing a comb-like or pectinate antenna, or clothed with long hairs and becoming plumose.

Palpus. — Two pairs of palpi occur about the mouth of most insects. The second pair or labial palpi are the smaller and quite often absent. The maxillary palpi are often refered to as the palpi even when the labial palpi are also present.

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No. 32. Berkeley California. Feb. 7 1895.

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The Coleoptera etc.

Lagochirus obsoletus Thos. L. Cerambyx tiger Horn* L. Mecotetartus antennatus Bates L. Lophopœum voltans Lec. L. Estola scrobida Lec. L. Tapeina multicornis Bates L. Tetraopes elegans Horn* L. Lema peninsulae Crotch L. flavidia Horn* omogera Horn* texana Crotch L. semida Horn* L. Babia costalis Lac. L. Coscinoptera aneipennis Lec. A. L. seminuda Horn A. L. minorea Lec. Eurysecpa leconteï Crotch. Exema conspersa Mann. Megalostomis ma or Crotch A. L. Bassareus congestus Fab. L. Pachybrachys dourieri Crotch xanti Crotch L. turbidus L. atomarius Nels. A. L. Diachus auratus Mann. Monachus guerinii Perbose. L. Myochrous longulus Lec.

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Hints for Teachers.

Third Paper.

The common red butterfly Danais archippus which may be collected at any season of the year is a good insect for study.

Considerable time could be very profitably given to a study of the wing pattern of this insect. First study the general pattern as a whole, the effect as viewed from different directions and with the wings in different positions, and the relation of wing and body pattern.

Attention may now be directed to a detailed study of the pattern of the wing Note the two sources of color and the difference in tone of the 'beetle black' of the cuticle of the veins and the softer black of the scales

The absence of shading in the scales is notable for what appears to be shading will be seen to be but the admixture of different colored scales. Make out the distribution of the different colored scales, viz. grey, black, dark brown, light brown, cream, and white.

The veination of the wings may next be studied to discover

con.

Hind tibiæ wich two spurs
Second segment of the abdomen not much longer than the third
Middle tibiæ with two spurs
Antennae thirteen jointed
Scutellum wanting..... **Isobrachium.**
Scutellum present
Maxillary palpi six jointed
Scutellum with a transverse grooved line at base.....
..... **Epyris.**
Scutellum with two foveae at base ..... **Mesitius.**
Maxillary palpi four jointed ..... **Dissomphalus.**
Antennae twelve jointed ..... **Perisemus.**
Middle tibiae without spurs ..... **Ampulicemorpha.**
Middle tibiae with one spur ..... **Gonotopus.**
Second segment of the abdomen about as large as all the others..
Labial palpi three jointed
Antennae thirteen jointed..... **Proctotrypes.**
Antennae fourteen or fifteen jointed
Mesonotum longer than wide
Third dorsal segment of the abdomen much longer than the fourth..... **Cinetus.**
Third dorsal segment of the abdomen not elongate.....
..... **Anictata.**
Mesonotum wider than long
Ocelli in a triangle
Marginal cell closed ..... **Pantoclis.**
Marginal cell open..... **Aclista.**

con

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THE ENTOMOLOGIST'S DAILY POST CARD.

Post Card Pub. Co. 2043 Lincoln St.
Subscription $2.00 per year.
Advertisements 50 cts. per inch.

No. 33. Berkeley California. Feb. 8 1895.

(17.705 NTD

HORN G. H.

The Coleoptera etc.

Chrysochus cobaltinus Lec. Metachroma peninsulare Crotch L. Myocorynа peninsularis Horn* L. Trirhabda flavolimbata Mann. luteocincta Lec. nitidicollis Lec. L. caduca Horn Monoxia consputa Lec. Diabrotica soror Lec balteata Lec. A. L. variegata Jacoby L. Scelolyperus maculicollis Lec. Luperodes varicornis Lec A. L. Malacorhinus maculatus Lec Metacycla insolita Lec L. Malacosoma brevicorne Jacoby A. L. Homophoeta lustrans Crotch L. Disonycha quinquevittata Sry Haltica ignita Illig. punctipennis foliacea Lec. A. L. tincta Lec. Epitrix cucumeris Harris flavotestacea Horn* L. Euplectroscelis xanti Crotch L. Systena taeniata Say Dysphenges con.

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Hints for Teachers.

Third Paper. con.

the relation between this and the pattern. The homology in both pattern and veination in the two pairs of wings should be closely made out.

Finally, the pattern may be studied from the standpoint of its evolution. Try to decide which is most primitive color, and the order in which the colors have arisen. The order of the appearance and the stages of development of the different markings should considered. A set of diagrams may now be constructed to indicate provisionally the different stages in the development of the pattern.

Almost any conclusion that might be drawn from a study of a single insect must be acknowledged to be provisional and at the same time reliable in most particulars.

A study as outlined above will stimulate and develope the habit of searching for the significance of every detail. The pupil should be led to discover every thing for himself so his knowledge will be 'I know' instead of 'the book says.'

Ocelli in a curved line..... **Zygota.**
Labial palpi two jointed
Submarginal vein about one half the length of the wing
Costal cell open..... **Hemilixis.**
Costal cell closed..... **Paramesius.**
Submarginal vein about one third the length of the wing
Wings with a basal nervure
Scutellum sub-convex or flat..... **Loxotropa.**
Scutellum with a profound fovea at base or two confluent foveæ..... **Basalis**
Wings without a basal nervure
Scutellum foveate at base
Basal joint of hind foot only a third longer than the second..... **Diapria.**
Basal joint of hind foot twice as long as the second..... **Trichopria.**
Scutellum not foveate at base..... **Phænouria.**
Hind tibiæ with a single feeble spur
Antennæ seven to twelve jointed
Labial palpi one jointed
With a distinct clavate submarginal vein
Submarginal vein half the length of the wing **Inestemna.**
Submarginal vein one third the length of the wing..... **Acerata.**
With scarcely the trace of a vein in the front wing
Scutellum semicircular
Scutellum convex..... **Polygnotus.**

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A Californian Journal of Entomology.

Organ of the U. C. Ent. Society

The Entomologist's Daily Post Card.

Post Card Pub. Co. 2043 Lincoln St.
Subscription $2.00 per year.
Advertisements 50 cts. per inch.

No. 34. Berkeley California. Feb. 9 1895.

QL 505 .H7 NTD (18.94)

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The Coleoptera etc.

elongatulus Horn* L. Longitarsus repandulus Lec. livens Lec. luridus Horn* L. Phyllotreta pusilla Horn A. L. Microrhopala rubrolineata Say ann. melsheimeri Crotch Charistena perspicua Horn A. L. ariadne Newm. L. Physonota alutacea Boh. L. Mesomphalia exclamationis Fab. Cassida bivittata Say A. L. Copteycla auricalcea Fab. significra Herbst. L. lacontei Crotch A. L. convexa Oliv. Boh. Brachys sordidus Horn bilobatus Horn L. impiger Horn amicus Horn A. L. prolractus Horn A. L. placidus Horn A. L. desertorum Lec. A. L. aureolus Horn prosopis Lec. lecosomus Sharp L. julianus Horn* L. Caryoborus veseyi Horn L. Spermophagus semicinctus Horn* L. con

A Simple Tray for Drying Microscopical Preparations.

The following plan for constructing drying trays produces an apparatus which has proven satisfactory in practice and are so that any one could make them.

Procure for this purpose pieces of tin or brass of the width desired for the top of the tray and an inch and a half longer. Bend each end back upon itself a half inch and then in the opposite direction one quarter inch, slightly more than a right angle. The half inch portions will thus be nearly vertical and form the support of the tray. These trays will fit one above the other into a compact stack.

In using these trays it is well to have in a stack at least as many trays as it requires days to sufficiently dry the preparations. If sun heat is used the tray containing the preparations of each day are placed on the bottom and each day the tray of finished preparations is removed and stored away. If a stove or heater is used the order may be reversed to keep the fresh preparation in the cooler place and to gradually increase it from day to day.

Scutellum flat.....**Trichalcis.**
Scutellum not semicircular
Scutellum with a short thorn or tubercle at the tip.....
.....**Polymecu .**
Scutellum with a strong awl-shaped thorn at the tip. ..
.....**Isorhombus.**
Scutellum triangular.....**Amblyospis.**
Labial palpi two or three jointed
Axilla not distinct
Abdomen without lateral carinæ.....**Telenomus.**
Abdomen with distinct lateral carinæ
Postmarginal vein absent
Lateral ocelli distant from the eyes....**Prosocantha.**
Lateral ocelli close to the eyes.....**Hadronotus.**
Postmarginal vein present.....**Sporosion.**
Axillæ distinct
Marginal vein stigmated
Ocelli nearly in a straight line .....**Lygocerus.**
Ocelli in a triangle.....**Megaspilus.**
Marginal vein not stigmated.....**Ceraphon.**
Antennæ thirteen jointed.....**Cosmocoma.**

The Proctotrypidæ are a family of very small parasitic wasps the larvae of which live chiefly within the eggs of other insects or within galls produced by flies.

Determinations.— We have been asked if would undertake to determine insects for subscribers to the Post Card. We will gladly do all in our power to name as far as possible any submitted for this purpose

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

Organ of the U. C. Ent. Society

THE ENTOMOLOGIST'S DAILY POST CARD.

Post Card Pub. Co. 2043 Lincoln St.
Subscription $2.00 per year.
Advertisements 50 cts. per inch.

No. 35 Berkeley California. Feb. 11 1895.

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(19.

HORN G. H.

The Coleoptera etc.

Edrotes ventricosus Lec. 1 Stibia punctipellis Horn 1. ovipennis Horn Triphalis perforatus Lec. 1. Trimytis obtusa Horn* 1, Epitragus pruinosus Horn Eurymetopon rufipes Esch. punctulatum Dec. 1. sodalis Horn A 1. bicolor Horn convexicolle Lec. Emmenastus punctatus Lec A 1. pingtis Lec A 1. longulus Lec A 1. obesus Lec. marginatus Casey 1, Emmenastrichus crosus Horn* 1, Batulius rotundicollis Lec. 1. Zopherus grandicollis Horn tristis Lec Phloeotes diabolicus Lec Centrioptera speculifera Lec 1. muricata Lec. 1. asperata Horn 1. variolosa Horn A. 1. sertata Lec. angularis Horn* 1. Cryptoglossa verrucosa Lec. Acrosebatia championi Horn 1.

con

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Reference Collections.

A collection of insects authentically determined and accessible to all is a wonderful incentive to the study of insects where ever it exists. Such a collection should be found in every county in the State. Illinois has long recognized the importance of such collections and besides making provisions for large collections at the capitol and at the State University the Legislature has for years maintained the Illinois State Laboratory of Natural History which distributes to the schools in the State free of charge carefully named collections of insects only requiring that the schools recieving them make proper provision for their care.

There should be named collections of all the commoner insects in every high school and examples of all the more important injurious insects not yet imported into this State.

At present there are small collections at at the University including the Ricksecker collection of beetles in the Agricultural department and the collection of Lepidoptera at museum brought

con.

A clearly defined W mark in the sub-terminal line
Margin of front wings strongly dentate....**cuculiformis**, Grt.
Margin of front wings slightly or not at all dentate
A broad blackish shade between the median lines
Orbicular round ..... **cariosa**, Gn. A.
Orbicular elongate
Dark brownish..... **antennata**, Smith
Bright reddish brown..... **anranticolor** Grt. A.
Ashy grey
Median space yellowish ..... **cinefacta**, Grt,
Median space dark..... **centralis**, Smith
No black shade between the median lines
Maculation distinct ..... **lignicolor** Gn. A.
Maculatian obsolete ..... **genialis**, Grt.
No clearly defined W mark in the sub-terminal line
A longitudinal black shade from base to transverse posterior line
..... **perpensa**, Grt A.
No such longitudinal black shade
Transverse lines distinct
Terminal space darker than the subterminal
Yellowish brown..... **albina**, Grt.
Dark brown ..... **pluviosa**, Wlk.
Pale ashy gray..... **occidens**, Grt N.
Subterminal space as dark as the terminal .....
..... **devastatrix**, Brace.
Sub terminal line indistinct..... **finitima**, Gn. O.
All transverse lines indistinct
Clasper of male reaching about half way to the tip .....

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ADVERTISEMENTS.

A Californian Journal of Entomology.

Organ of the U. C. Ent. Society

THE ENTOMOLOGIST'S

DAILY POST CARD.

Entered as second class mail.

Post Card Pub. Co. 2043 Lincoln St.

Subscription $2.00 per year.

Advertisements 50 cts. per inch.

No. 36 Berkeley California. Feb. 12 1895.

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HORN G. H.

The Coleoptera etc.

inaequalis Lec. 1. Asida morbillosa Lec. 1. agreta Lec. 1. bituna Lec. 1. convivens Lec 1. sexcostata Lec 1. gabbii Horn 1. pilanata Horn* 1. subvittata Horn* 1. emblaphoides Horn* 1. convexa Lec. 1. Eusattus costatus Horn 1. crosus Horn 1. productus 1. sculptus Champ. 1. laevis Lec. ciliatus Horn* 1. scutus Horn* 1. Colomorpha maritima Casey Conicatis pallidicornis Casey 1. Elecdes militaris Horn lucae Lec 1. grandicollis Lec. innocens Lec 1. gracilis Lec. A. 1. gentilis Lec. A. 1. gigantea Lec. acuticauda Lec quadricollis Esch. humeralis Lec. consobrina Lec. Eulabis pubescens Lec. 1. Argoporus ebenina Horn* 1. inconstans Horn* Cerenopus con

Reefrence Collectios. con together by Mr. Rivers, at San Francisco in the Academy of Science and with the State Board of Horticulture though the latter consists chiefly of the private collections of Messrs Harford and Kobele. These constitute all the public referende collections of any importance.

There are a number of private collections that are quite excellent but they are confined either to Coleoptera or Lepidoptera and collections public or private out side of these two Orders worthy of mention do not exist.

Why should we not have an Entomological survey of the State as well as a Botanicpl survey? Insects are certainy as important our wild flowers.

At a relatively small expense a corps of collectors could be put in the field and in a season or two an immense amount of material would be accumulated which after study could be arranged in sets and distributed over the State.

Foreign insects could be obtain as exchanges in most cases. The insects likely to be introduced may thus be made known.

.....latetitia, Hufn.

Clasper of male reaching nearly to the tip..cogitata, Smith

The foregoing synopsis includes a group of moths of some of the commoner cutworms. Other synopses will follow covering the other common cutworms. A synopsis of the genera of the family is not now possible and it is to be hoped that Prof. J. B. Smith, who is the American authority in this group will before long supply this want. For the present one will be compelled to depend chiefly to figures in entomological works for suggestions as to generic position. The insects in the above synopsis are referred to the genus Hadena in most of the books.

Notes for Beginners. No, 5.

Epimeron. — The upper or posterior of the two principal divisions of the side of the thorax between the legs and the wings It very variable in size and shape and in some insects quite indistinguishable.

Episternum. — This is the most important of the side pieces, It is almost always large and sometimes nearly replaces the sternum and epimeron. The episternum and epimeron together are sometimes called the pleuræ

Epipleuræ. — This term is only used in Coleopterology and there is used to designate the sharply marked inflexed lower edge of the elytron.

Elytron. — The elytra are the more or less horny upper wings of beetles though occasionally the thickened wings of insects of other Orders are so designated.

Pro- Meso- Meta- — These three prefixes where ever used refer to the first second and third segments of the thorax respectively.

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A Californian Journal of Entomology.

Organ of the U. C. Ent. Society

THE ENTOMOLOGIST'S DAILY POST CARD.

Post Card Pub. Co. 2043 Lincoln St.
Subscription $2.00 per year.
Advertisements 50 cts. per inch.

No. 37. Berkeley California. Feb. 2 1895.

QL 505 .H7D (16.

HORN G. H.

The Coleoptera etc.

Lagochirus obsoletus Thos. L. Cerropeus niger Horn* L. Merotettarus antennarius Bates L. Lophoperum volitans Lec. L. Estola sordida Lec. L. Tapeina nudicornis Bates L. Tetraopes elegans Horn* L. Lena peninsulae Crotch L. flavidia Horn* omogera Horn* texana Crotch L. annula Horn* L. Babia costalis Lec. L. Coscinoptera aneipennis Lec. A. L. seminuda Horn A. L. mucorea Lec. Eurycopa leconteï Crotch. Exema conspersa Mann. Megalostomis major Crotch A. L. Bassareus congestus Fab. L. Pachybrachys donneri Crotch xanti Crotch L. turbidus L. atomarius Mels. A. L. Diachus auratus Mann. Monachus guerinii Perbosc. L. Myochrous longulus Lec.

con

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Hints for Teachers.

Third Paper.

The common red butterfly Danais archippus which may be collected at any season of the year is a good insect for study.

Considerable time could be very profitably given to a study of the wing pattern of this insect. First study the general pattern as a whole, the effect as viewed from different directions and with the wings in different positions, and the relation of wing and body pattern.

Attention may now be directed to a detailed study of the pattern of the wing Note the two sources of color and the difference in tone of the 'beetle black' of the cuticle of the veins and the softer black of the scales.

The absence of shading in the scales is notable for what appears to be shading will be seen to be but the admixture of different colored scales. Make out the distribution of the different colored scales, viz. grey, black, dark brown, light brown, cream, and white.

The veination of the wings may next be studied to discover

con.

Hind tibiæ wich two spurs
Second segment of the abdomen not much longer than the third
Middle tibiæ with two spurs
Antennae thirteen jointed
Scutellum wanting..... .....**Isobrachium.**
Scutellum present
Maxillary palpi six jointed
Scutellum with a transverse grooved line at base.....
..... **Epyris.**
Scutellum with two foveae at base... .....**Mesitius.**
Maxillary palpi four jointed ..... **Dissomphalus.**
Antennae twelve jointed ... ... **Perisemus.**
Middle tibiae without spurs ..... **Ampulicemorpha.**
Middle tibiae with one spur ..... **Gonotopus.**
Second segment of the abdomen about as large as all the others..
Labial palpi three jointed
Antennae thirteen jointed..... **Proctotrypes,**
Antennae fourteen or fifteen jointed
Mesonotum longer than wide
Third dorsal segment of the abdomen much longer than the fourth.... .....**Cinetus.**
Third dorsal segment of the abdomen not elongate.....
.....**Anictata.**
Mesonotum wider than long
Ocelli in a triangle
Marginal cell closed .....**Pantoclis.**
Marginal cell open..... .....**Aclista.**
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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

Organ of the U. C. Ent. Society

THE ENTOMOLOGIST'S DAILY POST CARD.

Entered as second class mail.

Post Card Pub. Co. 2063 Lincoln St.

Subscription $2.00 per year.

Advertisements 50 cts per inch.

No. 38 Berkeley California. Feb. 14 1895.

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(22.2 B5 no.38-54

HORN G. H.

The Coleoptera etc.

Horn L. Alphitobius piceus Oliv. Anedus rotundicollis Lec. A. L. Phaleria pilifera Lec. rotundata Lec. debilis Lec. Diaperis rufipes Horn A. L. Platydema subquadratum Motsch. A. L. Helops pingus Horn* Phelius opaculus Horn* L. Allecula sordida Horn* L. Hymenorus ruficollis Champ. A. L. confertus Lec. L. planulus Horn* L. Othnius mexicanus Horn L. Statira submitida Lec. L. Hyporhagus opaculus Lec. L. Eustrophus arizonensis Horn A. L. Calopus asperus Lec. L. Nacerdes melanura Linn. Oxacis fuliginosa Lec. L. lucana Lec. L. Mordella scutellaris Fab. Mordellistena vilis Lec. Anaspis rufa Say pusio Lec. Pactrecnus concolor Lec. L. Noteus

54.

Borers in Peach Trees.

The common peach tree borer Sannia pacifica, occasionally becomes quite injurious, but is perhaps the most controlable of our boring insects.

The best treatment is the destruction of the worms with hot water and coating the base of tree with poisoned paint

The use of coal tar or any such material for destroying the worms after they have gained entrance to the tree is sometimes effectual but dangerous to the tree. There is a great difference in coal tar and some may be safe but it is not usually so.

In cutting out the worms as is usually recommended, one is likely to injure a great deal of healthy bark, so much so that it would often be better to leave the worms alone.

Water may be used almost at the boiling point without injury. Just pour it about the crown, after removing the earth a little.

The paint recommended is glue to which has been added enough Paris green to make it a light pea green.

This is not safe on young trees on which the bark is still green.

Orbicular open above
Front wings blackish beneath ..... **subgothica**, Haw.
Front wings pale beneath ..... **evanidalis**, Grt.
Orbicular not open above
Hind wings dusky
Ordinary spots bordered with yellowish ..... **gravis**, Grt.
Ordinary spots not bordered with yellowish
Subterminal line strongly dentate though often subobsolete
Collar blackish ..... **venerabilis**, Wlk.
Collar not tipped with black ..... **volubilis**, Harv.
Subterminal line rather even
Claviform always distinct ..... **vancouverensis**, Grt.
Claviform barely traceable ..... **aeneipennis**, Grt.
Hind wings clear pearly white
Claviform very distinct black ..... **malefida**, Gn.
Claviform faintly outlined ..... **annexa**, Treit.

This is another group of cutworm moths generally classed as Agrotis.

Notes for Beginners. No, 6.

Ungues — The ungues or claws are attached to the last segment of the foot, generally at the end. There are usually two on each foot but sometimes a single one and occasionally there is none at all The claw is usually large at base tapering to a slender hooked point. On the lower or concave side the claw often becomes toothed and the varying number and size of these teeth are the most important characters of the claws for systematic purposes. The most common modifications are the serrate when the teeth are smalla nd uniform, pectinate when long, cleft if but one long tooth is present.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

Organ of the J. C. Ent. Society

THE ENTOMOLOGIST'S DAILY POST CARD.

Entered as second class mail.

Post Card Pub. Co. 2043 Lincoln St.

Subscription $2.00 per year.

Advertisements 50 cts. per inch.

No. 39 Berkeley California. Feb. 15 1895.

(23.75 .T3

HORN G. H.

94.

The Coleoptera etc.

calcaratus Horn monodon Fab. Anthicus elegans Laf. L. confinis Lec. ictericus Laf. L. nanus Lec. L. Xenogenatha lurida Lec. A. L. apicalis Lec. picata Fab. nigripennis Lec. sparsa Lec. L. Macrobasis virgulata Lec. L. tenuilineata Horn* L. Epicauta pedalis Lec. A. L. Cantharis nuttata Horn A. L. childii Lec. Calospasta decolorata Horn* L. nubrabilis Horn Tegrodera erosa Lec. pyrota trochanterica Horn* L. Tetraonyx dubiosus Horn* L. Rhipiphorus cruentatus Germ. Elytrachites planifrons Lec. L. aratus Say L. Epiaegeres lucanus Horn* L. Anomalus obliquus Horn L. Eupagoderes lucanus Horn L. Rhigopsis simplex Horn* L. Orthocnema protracta Horn con

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Indexing Card Indexes.

The greatest objection to card indexes is the ease of losing a card by misplacing it in the drawer. It is possible by a very simple arrangement to overcome this difficulty

The plan proposed is as follows: Divide the top of a card into to twenty six equal divisions corresponding to the letters of the alphabet. Now with a small punch take out a semicircular piece from the upper edge of each card opposite the appropriate letter of the divided guide card.

The position of the notches will show at a glance as one looks at the index if any card is with those of a wrong letter. Except in the smallest indexes it will be necessary to indicate more than one letter. This is done as soon as a bunch of cards becomes too large for convenience by indicating the next by a spot of a certain color, thus, blue for second letter, red for third, etc.

Another use to which this plan could be put is in making cards arranged in some other order than alphabetically somewhat more easy to consult when the name is known.

Transverse lines mostly indistinct
Ordinary spots mostly confluent
Collar with black line ..... **lagena**, Grt.
Collar unlined ..... **albalis**, Grt. N.
Ordinary spots not confluent
Orbicular rounded
Hind wings pearly white ..... **albicosta**, Smith A.
Hind wings blackish ..... **proclivis**, Smith A.
Orbicular elongate ..... **acclivis**, Morr. A.
Transverse lines distinct ..... **abnormis**, Smith

These moths are not very important economically though the larvæ are cutworms.

Preparation of Insects for Histological Purposes.

There are many ways of fixing and hardening insect tissues giving good results. Doubtless any of the methods used by histologists or embryologists would be useful with insect tissue at least for some effect. A method which seems to be little used for other tissues gives such uniformly good results that it deserves to be called the insect method.

The insect method consists in placing the tissue in hot water to kill and fix it and then into alcohol to harden. A good course of procedure is as follows: 1. Hot water (90-95 degrees Centigrad) five minutes. 2. Alcohol 30 per cent, one half hour. 3. Alcohol 50 per cent, one hour. 4. Alcohol 70 per cent, one day. 5. Alcohol 95 per cent, one day or until ready to use.

Specimens prepared in this way are usually but little shrunken and take stains readily. A comparatively large amount of fluid at each step of the process is necessary for the best results.

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THE ENTOMOLOGIST'S

DAILY POST CARD.

Entered as second class mail.

Post Card Pub. Co.
2043 Lincoln St.
Subscription
$2.00 per year.
Advertisements
50 cts. per inch.

No. 40 Berkeley California. Feb. 16 1895.

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(24.3.15

Collections in Papers.

Most collectors are content with a pair or a couple of pairs of each species. Such a course does not permit of some of the most interresting lines of study such as variation in species, seasonal and otherwise.

The great abundance of species and the care and time necessary to make a good cabinet specimen is sufficient reason for the common practice. By preserving the specimens in papers much as the ornithologist does his bird skins, a collection may be accumulated which will become very valuable for these purposes.

A number of styles of papers are used for this purpose. The botanical envelope which is often used for insects, is made by folding a sheet of paper so as to leave about a half of an inch of one end projecting. This projecting edge is bent back and about a half inch of each side is folded in the opposite direction completing the envelope.

The triangular envelope which is used a great deal requires a paper a little longer than broad. It is folded diagonally leaving the

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94.

HORN G. H.

The Coleoptera etc.

Eucyllus vagans Horn Geodercoles hispidus Horn* L. Thriciolepis semimuda Horn* L. Pandeletejus cinereus Horn A. L. Scythropus delicatulus Horn* L. Mitostylus gracilis Horn* L. Polydorosus peninsularis Horn* L. Sitones sordidus Lec. Macrops echinatus Dietz. L. Centrocleonus porosus Lec L. Lixus perforatus Lec. pleuralis Lec A. L. Dorytomus inaequalis Casey L. Otidocephalus ulkei Horn L. Macrorhoptus hispidus Dietz. Anthonomus peninsularis Dietz. L. pervilis Dietz. L. ebeninus Dietz. L. ochreopilosus Dietz. L. ligatus Dietz. A. L. Tychius setosus Lec. Sibynes fulvus Lec. A. L. Laemosaccus plagiatus Fab. A. L. Zascelis serripes Lec. L. squamigera Lec.

Orbicular open above
Collar tipped with black
Pale yellowish gray ..... **exsertistigma,** Morr.
Dark grayish brown or purplish ..... **formalis,** Grt.
Reddish brown ..... **costata.** Grt.
Collar not tipped with black
Subterminal space darker than the median
Grayish brown ..... **discoidalis,** Grt. O. N.
Reddish brown ..... **cupidissima,** Grt.
Subterminal space not darker than the median
Yellowish or grayish ..... **lætula, Grt.**
Dark brown ..... **crenulata,** Smith
Orbicular not open above
Collar black above
Ordinary lines obsolete ..... **carrissma** Harv
Ordinary lines distinct ..... **rufipectus,** Morr,
Collar not black above
Thorax with distinct front and hind tufts
Reniform of the same color as the rest of the wing ..... **inelegans,** Smith
Reniform contrasting with the rest of the wing ..... **mirabilis,** Grt. A,
Thorax not distinctly tufted
Transverse lines pale but distinct
Terminal space pale, contrasting with the rest of the wing ..... **placida,** Grt. N. A.
Terminal space not contrasting ..... **trigona,** Smith
Transverse lines indistinct ..... **variata** Grt.

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No. 41 Berkeley California. Feb. 18 1895.

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Collections in Papers. con. ends extending. These ends are now folded over to complete the envelope. At the acute angles the paper is again folded and the angles made fast by giving them a slight twist.

A third style of package is the envelope made by doubling a paper twice and then folding back the edges More paper is used with this method than with the others and is generaly adopted when the collection is to be packed and shipped.

The paper tube made by wrapping a piece of paper about the end of a lead pencil or other small cylinder, folding down one end and then slipping the tube off. After putting the insect in, the other end is twisted and doubled together.

Any kind of paper may be used such as old news papers. The accessions number should be very plain and if news papers are used the numbers should be written with a colored pencil.

Collections in papers should be kept in tight boxes. Any box may be made tight by pasting the cover on with strips of gummed paper.

94.

The Coleoptera etc.

L. Cœlosternus hispidulus Lec. L. Copturus quadridens Horn* L. Trichobaris trinotata Say A. L. Baris peninsulæ Horn* L. Cactophagus validus Lec. Sphenophorus simplex Lec. Scyphorus acupunctatus Gyll. A. L. robustior Horn yuccæ Horn Calandra oryxæ Fab. Apotrepes densicollis Casey L. Brachythus lucanus Horn L. peninsulæ Horn* L. Platypus rugulosus Chap. L. Hypothenus Lec Anthribus vagans Horn* L. Brachytarsus griseus Lec. L.

Porosagrotis.	Noctuidæ.	Lepidoptera.
Orbicular round		orthogodia, Morr A
Orbicular elongate oval		dollii, Grt. A.
Orbicular bottle shaped		milleri, Grt.
Orbicular quadrate		pluralis, Grt. N.

Notes for Beginners. No. 7.

Coxæ. — The coxa is the first segment of the leg. It varies greatly in size and appearance being sometimes long and slender, or large and firmly attached to the thorax and becoming an important part of it as in Lepidoptera, and sometimes as in many beetles fitting into coxal cavities.

Trochanter, Trochantine, — These names are used to designate the small segments between the coxa and femur or thigh. They are not always used consistently. If either is present it is called the trochanter and if both are present the smaller is called the trochantine.

Femora. — The femur is usually the largest part of the leg and is for this reason at once recognizable. Occasionally it not so conspicuously larger than some other part in which case the elbow-like joint by which it is joined to the tibia will enable one to decide quite easily.

Subcostal vein. — This is the fundamental rib or vein of the wing of an insect. It is al ways present atleast at base and gives rise to the prominences which form the bearings of the wing. It usually lies a short distance behind and parallel with the front edge of the wing but occasionally it fuses with the costal vein and lies on the margin. The vein is usually branched towards the tip, the branches mostly projecting forward. It often partially fuses with the independent vein behind.

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Feb. 19 1895

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Methods for Preserving The Post Card.

The Entomologist's Daily Post Card is designed to be something more than a transient news paper. Two features are expected to have a more permanent value.

The bibliography will increase in value as it becomes larger and it will be very important to have the set complete. The synopses will in time become out of of date as our knowledge of the fauna increases and will be replaced by others.

The method therefore recommended for preserving the cards is to arrange them at first according to the synopses and after a while they may be placed in an arrangement according to the author In either arrangement it is desirable to be able to readily refer to the other title. For this reason both title and bibliographical reference begin at the same corner of the card.

The end with the heading on one side and the advertisements on the other may contain the punch holes for binding the cards into bunches if desired. The synopses of an Order or Family may thus be tied together.

ALDRICH J. M.
The Tipulid Genert Bittacomorpha and I edicia.
Psyche, Vol. VII. pp. 200-202.
Bittacomorpha sackeni Roder N. occidentalis Ald *

Setagrotis.	Noctuidæ.	Lepidoptera.
Transverse lines distinct		congrua, Smith O.
Transverse lines indistinct		
Hind wings dusky		vernilir, Grt
Hind wings white		infimasis, Grt.

Raising Cutworm Moths.

The time is about at hand for obtaining full fed specimens of most of our cutworms. A special effort should be made to identify the larvæ of all the commoner species. This will require the careful study of the worms and the rearing of the moths.

Very often this can be done without apparatus by finding places where a single species greatly predominates and after the worms have pupated collecting a large number of these pupæ and allowing them to develope into moths. Specimens of the worms and of the pupæ should of course be preserved in alcohol for future reference and comparison. It may sometimes happen that two quite distinct moths come from worms so similar that their differences were overlooked This method is very reliable for the commoner species but other means must be employed for tracing out the life-history of most of the species.

For the rarer forms a good method is to use ordinary flower pots laying a broken piece of pot over the hole in the bottom in the usual way and planting in pot a bit of sod The soil should not quite reach to the top of the pot so that when a piece of cheese cloth is tied over the top there will be plenty of room for the moth that is to emerge. After putting in the worm and tying on the cloth the pot is partly imbedded in sand thus kept moist. A single worm is all that ought to be put in a pot. It is always most desirable to keep alcoholic specimens of all stages.

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No. 43 Berkeley California. Feb. 20 1895.

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Locality labels.

The common practice of collectors is to use a small printed label to indicate in a general way the locality and sometimes also the date, altitude or collector, as:

Cal. Berkeley Cal.
Oakland Cal. Mt. Shasta.
4 Apr 94. 1500 ft.

The paper of the locality label is cut as small as can be and is usually printed with a smaller type than this.

Another method very often employed is the use of small disks of differently colored paper for each locality.

We will offer another method. Select a conductor's punch giving a figure approximating the the shape of the State, County, or other defined region. The shape of the disks then will indicate the locality of the specimen. This may be still more accurately designated by placing a small dot on the part of the disk corresponding to the place of collection.

This will leave the color of the disk for indicating some other fact in regard to the specimen as for example the month is which con.

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Tent Caterpillars.
Oregon Agricultural Experiment Station Bulletin No. 33. pp. 3-5.
Clisiocampa erosa, pluralis, constricta

94.

Reniform yellowish
- Collar tipped with black.....**indeterminata,** Wlk.
- Collar yellowish above.....**stellaris,** Grt. N.

Reniform reddish
- Median space much paler than the rest of the wing **apposita,** Grt.
- Median space as dark as the rest of the wing.....**quarta.** Grt.

Notes for Beginners. No 8.

Diagram of the wing markings of cutworm moths.

In the above diagram all the prominent markings of the wing are indicated. Beginning at the right which is the point of attachment to the body, the spots are named as follows: Basal dash. Basal line. Transverse anterior line. Claviform spot. Orbicular spot. Median line or shade. Reniform spot. Transverse posterior line. Subterminal line. Apical spot. Terminal line spots or lunules. Only occasionally are all these markings present.

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Locality labels. con.

the insect was captured A color scheme for the months will be presented in a later issue.

The labels containing the names may be made doubly useful if they indicate the locality or rather the distribution of the group. For this purpose there should be printed on each label in pale ink a map of the world. On this map the locality of each specimen in the collection is indicated by a dot.

The known distribution of the insects even though not represented by specimens in the collection may also be indicated but in this case it is best to use a differently colored spot.

In the study of the fauna of a limited region the same method will be found useful substituting for the map of the world a map of the region under consideration. Such a plan will be found useful even for the smallest regions.

—o—

There will be no issue tomorrow it being a holliday. In this connection we will say that advantage will be taken of enough legal and other holidays to make just 300 issues during the year.

94.
The Grain Plant Louse. - - Siphonophora avenae, Fab.
Oregon Agricuitural Experiment Station Bulletin No. 33. pp. 5-9
Siphonophora avenae Fab. O. Hippodamia convergens. O.

Costal margin of the front wings depressed, slightly concave
Transverse posterior line distinct.....**wilsonii**, Grt.
Transverse posterior line obsolete.....**lacunosa**. Grt.
Costal margin of the front wings not concave
Subterminal line indented by four whitish streaks
Hind wings white
Ordinary spots bright yellow.....**recula**, Harv. O.
Ordinary spots pale yellow
Orbicular round
A white stripe crossing the thorax just behind the collar
.....**niveilinea**, Grt. A.
No white stripe crossing the thorax behind the collar....
.....**quadridentata**, G. & R. O.
Orbicular oblong.....**brevipennis**, Smith
Hind wings dusky
Orbicular narrow.....**plagigera**, Morr. N.
Orbicular round
Costa yellowish
Collar yellowish except above....**flavicullis**, Smith A.
Collar not yellowish.....**flavidens**, Smith A.
Costa not yellowish.....**ridingsiana**, Grt A.
Subterminal line not indented by white streaks
Discal cell not filled with dark
Median shade line absent
Collar with a black transverse line or shade
Ordinary spots not confluent
No longitudinal line at base
con.

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No. 45 Berkeley California. Feb. 23 1895.

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Zoological Section.

At the next regular meeting of the Zoological section of the Science Association of the University of California which is to be held next Tuesday evening at 7.30 o'clock in the Entomological Laboratory, Mr. Woodworth will discuss the color pattern of the wings of butteaflies. These meetings are open to all who may desire to attend

Food of Lady Birds.

In number eight of the Post Card we expressed a desire to have observations made upon the hibernation of lady birds, and now that they have appeared in larger numbers than usual we would recommend that attention be given to the question of their food. We all know in a general way that lady birds eat scale insects and plant lice. It is only rarely true however that one finds the adult beetles much more abundant on lousy or scaly plants than elsewhere. They certainly must have other food and this is especially true of these insects in the fall and spring. The question should be settled by direct observation in the field.

MARLATT, C. L.: 94.
The Codling Moth Double-brooded.
Insect Life Vol. VII. pp. 248 251.
(Carpocapsa pomonella.)

Front wings yellowish ..... bicellaris, Grt
Front wings gray ..... brocha, Morr. N
A distinct longitudinal black line ..... cogitans, Smith
Ordinary spots confluent
Hind wings dusky ..... hollemani, Grt.
Hind wings white ..... biclavis, Grt. A
Collar not black above
Hind wings dusky
Transverse lines obsolete
Ordinary spots indistinct ..... perfusca, Grt.
Ordinary spots distinct ..... punctigera, Walk N A
Transverse lines distinct
Subterminal line distinct
Transverse posterior line continuous .....
..... luteola, Smith A.
Transverse posterior line punctiform .....
..... serricornis, Smith
Subterminal line indefinite ..... tetrica, Smith N.
Hind wings white, with the border dusky
Hind wings with a median line ..... mœrens, Grt A.
Hind wings with no median line ..... atomaris, Smith
Hind wings white
Ordinary spots distinct ..... gagates, Grt.
Ordinary spots obsolete ..... citricolor, Grt. A.
Median shade line distinct
Thorax with basal tufts only
Color pale yellow ..... fenisseca, Harv.

con.

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Post Card Pub. Co
2043 Lincoln St
Subscription
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No. 46 Berkeley California. Feb. 25 1895.

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Quarantine Laws.

In an editorial in the last number of Insect Life Mr. L. O Howard urges upon Horticulturists and others in the East the desirability of securing State quarintine laws similar to those of California. It may be well to point out the impracticability of our laws under Eastern conditions especially since some of these conditions will ultimately prevail here also.

The warfare in this State is carried on by the State Inspector and his deputies acting under the State Board of Horticultuie, and the County Horticultural Commissioners and their Inspectors under the Supervisors of the respective Counties. These various boards act independently of each other and with very different degrees of thoroughness.

Like other laws this will not inforce itself and meets with opposition. Only in those Counties that are preemintly fruit raising districts can its provisions be fully carried out even after these years of education. The laws would be wiped from the statute books if it were attempted.

con,

COQUILLETT D. W.
The Patent on the Hydrocyanic Acid Gas Process Declared Invalid.
Insect Life. Vol, VII. pp. 257-258.
[Aonidia aurantii,]

c4.

Front wings reddish brown.....**trifasciata.** Smith O.
Thorax with a divided anterior tuft
Claviform spot present
Transverse lines distinct
Transverse lines dark
Collar with a narrow black line above.....
.....**messoria,** Harr
Collar not black above
Orbicular pale.....**orbicularis,** Smith N.
Orbicular as dark as the rest of the wing .....
.....**fuscigera,** Grt.
Transverse lines pale
Color dark gray.....**choris,** Harv. N.
Color very dark reddish brown.....**intrita,** Morr.
Transverse lines indistinct
Orbicular irregularly elongate.....**fauna;** Morr.
Orbicular round
Hind wings rather pale .....**friabilis,** Grt.
Hind wings very dark .....**micronyx,** Grt.
Claviform wanting
Transverse lines geminate
Basal and median spaces not contrasting in color
Terminal space as pale as the median space.....
.....**brunneigera,** Grt.
Terminal space darker than the median space
Color bluish ashy gray.....**incallida,** Smith
Color yellowish .....**lutulenta,** Smith

con.

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Entered as second class mail.

Post Card Pub. Co. 2013 Lincoln St.

Subscription $2.00 per year.

Advertisements 50 cts. per inch.

No. 47 Berkeley California. Feb. 26 1895.

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Quarantine Laws. con.

The earlier laws were defective and no case could be made if a matter were carried to the courts. Even now with a law the constitutionality of which has been tested Horticultural Commissioners commonly obtain compliance with the law not by process of law but by threatening to injure the business interests of the party attempting to evade the law or objecting to a Commissioner's judgment. Injustice is thus sometimes borne rather than win the enmity of a Commissioner

These will be the results any where such laws are tried and the quite notable results obtained under our quarentine system are less the result of the system than the result of our peculiar situation We have but one important seaport, a single system of railroads and wide stretches of mountain and desert between us and our nearest neighbors. Added to this is the fact that a comparatively small number of large nurseries supply almost all the trees for planting making the guarding against importations

con,

94.

HOWARD L. O.
Two More Imported Vedalias.
Insect Life Vol. VII. p. 271.
Icerya purchasi, Vedalia cardinalis

Color reddish gray ..... **annulipes**, Smith
Wings reddish median space ashy gray .....
..... **murdocki**, Smith O.
Transverse lines single ..... **quinquelineata**, Smith
Distal cell filled with black
Transverse lines single ..... **munis**, Grt. Ni
Transverse lines geminate
Basal dash of front wings wanting
Hind wings dusky
Claviform wanting ..... **alticola**, Smith
Claviform present
Orbicular open above ..... **vetusta**, Walk.
Orbicular complete
Color bluish white ..... **vetusta**, Walk.
Color gray or brown
Collar with a black line above ..... **satis**, Harv.
Collar not black above
No contrast in color between median and subterminal spaces. ..... **rena**, Smith
Median space darker than the subterminal
Color even ..... **insula**, Walk.
Irrorate with black ..... **tessellata**, Harr.
Hind wings white
Yellowish gray ..... **spectanda**, Smith
Yellowish brown ..... **nostra**, Smith
Basal dash of front wings present
Subterminal line preceded by black sagitate spots
con.

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Entered as second class mail.

Post Card Pub. Co. 2043 Lincoln St.
Subscription $2.00 per year.
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No. 43 Berkeley California. Feb. 27. 1895.

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SMITH, J. B, (3.

A Catalogue, Bibliographical and Synonymical, of the Species of Moths of the Lepidopterous Superfamily Noctuida, found in Boreal America. With Critical Notes.

Bulletin of the United States National Museum. No. 44. 424 pp.

Thyatria scripta Gosse Bombycia teatlii H Edw. Pantheapalata Grt. A. Charasdra decora Mort. Feralia februalis Grt. Merolonche spica Grt. Euphui Grt. Aeronycta

Quarantine Laws. con.

of pests a comparatively simple thing. Nearly all trees are in commercial orchards and the owners are willing to spend considerable money to keep their orchards clean.

In the East no State is isolated but there are innumerable highways of traffic and hundreds of small nurseries and thousands of small neglected orchards in every State. If in California as valuable a fruit as the orange is to be found abundantly on the market in San Francisco covered with scales, can it be expected that the producer of the cheaper eastern fruit will sustain and observe such a law as ours.

No distinction is made between the inspection of imported fruit and nursery stock and that of local nurseries and orchards for the problem is one. With the closest inspection some will pass unnoticed and all that can be hoped is to reduce the chances of immediate importation. The local inspections likewise decrease the chance of spreading by preventing it from becoming excessively abundant.

con.

Orbicular V-shaped ..... **furtivus**, Smith
Orbicular complete ..... **perexcellens**, Grt
No sagitate spots before the subterminal line
Costal region not paler
Hind wings dark
Costal and median veins white **divergens**, Walk.
No white lines on the veins ..... **colata**, Grt.
Hind wings pearly gray ..... **atsifera**, Grt.
Costal margin of front wings pale
Subterminal line distinct ..... **tesselloides**, Grt.
Subterminal line obsolete ..... **silens**, Grt

The above synopsis contains the species C. vetusta Walk. twice by mistake, either entry may be omited. This genus is one of the largest in number of species in the Order.

Notes for Beginners. No 9.

Parts of the Wing. —

Base. The part nearest the body.

Apex. On the front wings the part furtherest from the base and the corresponding part of the hind wings even though not always the part most distant from the base

Hind angle. A wing is approximately a triangle, and the hind angle is the region of the angle nearest the tip of the abdomen when the wings are at rest. On the hind wing it is often called anal angle.

Costa. The front edge of the wing, the margin from the base to the apex

Outer or Exterior Margin. The edge of the wing between the apex and the hind angle.

Inner Margin. The edge between hind angle and base.

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THE ENTOMOLOGIST'S DAILY POST CARD.

Entered as second class mail.

Post Card Pub. Co. 2043 Lincoln St.
Subscription $2.00 per year.
Advertisements 50 cts. per inch.

No. 49 Berkeley California. Feb. 28. 1895.

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SMITH, J. B,

A Catalogue etc. 93.

tritona Hbn. O. felina Grt. lepusculina Gn. luteicoma G. & R. O edolata Grt. A. Cerma olivacea Smith Bryophila viridata Harv Rhynchagrotis rufipectus Morr. placida Grt N A. variata Grt. trigona Smith* inelegans Smith mirabilis Grt A. carissima Harv. exsersistigma Morr. formalis Grt costata Grt. laetula Grt. discoidalis Grt O N. cupidissima Grt. crenulata Smith Adelphagrotis stellaris indeterminata Walk. quarta Grt. apposita Grt Abagrotis errrtica Smith Pachnobia chierascens Smith Setagrotis congrua Smith O. vernilis Grt infimatis Grt Agrotis aurulenta Smith ypsilon Rott nanalis Grt. N. Peridromia saucia Hbn. incivis Gn. Noctua con,

Quarantine Laws. con.

A system to be the most efficient must be national If it were not for our stringent custom regulations it would almost be necessary that it be international In this State each County acts independently and the different ideals of the Commissioners makes necessary a great deal of reinspection. A more serious matter is the injustice to all parties concerned from this want of uniformity of inspection. Sometimes things are passed which are dangerously infested and on the other hand things are often condemned without just cause. This cannot be prevented under the present laws. The appointing power of the County Boards should be those who know the requirements of the office and the tenure should never depend upon political pull.

Again the passing or condemning of that which is inspected should not depend wholy upon the judgment of a local inspector but there should be more convenient means of appeal than the courts. The arbitrary actions of local inspectors have produced

con,

Transverse lines distinct

Claviform present..... ... **ypsilon**, Rott

Claviform wanting ..... **aurulenta**, Smith A.

Transverse lines mostly absent..... ....**nanalis**, Grt. N.

The latter species may not belong to this genus as the male is not known, Most of the species called Agrotis in the books belongs to genera previously treated.

Notes for Beginners. No 10.

Colors. — The following terms used in descriptive entomology are often misunderstood:

Æneous Bronze colored.

Brunneous. A pure bright brown.

Castaneous. Chestnut brown

Cinereous. Dark gray

Cupreous. Copper colored.

Ferreeus. Iron gray.

Ferrugineous. Rust red.

Fuliginous. Soot brown.

Fulvus. Light brown.

Fuscus. Dull dark brown;

Glaucous. A bright blue inclining to gray.

Livid. A pale yellow.

Lurid. A dirty yellow inclining to brown.

Luteous. Clay yellow.

Piceous, Pitchy black.

Pruinose. Covered with a whitish bloom.

Sanguineous. Blood red.

Testaceous. Dull yellowish brown.

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THE ENTOMOLOGIST'S DAILY POST CARD.

Entered as second class mail

Post Card Pub. Co. 2043 Lincoln St.
Subscription $2.00 per year.
Advertisements 50 cts. per inch.

No. 50 Berkeley California. Mar. 1. 1895.

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Quarantine Laws. con.

the greater part of the dissatisfaction with the laws.

The whole system should be in the hands of men of ability and good judgment and considerable special knowledge, but not by a ly means necessarily scientific entomologists. There should be however an experiment department in charge of men of the highest scientific ability where all quarantine rules will be thoroughly and scientifically tested before they are enforced.

The people of the Eastern States with their smaller financial risks will not sustain quarantine laws without some such safeguards, and the same will be true sooner or later in California.

To recapitulate, the complexity of the problem in the East requires a stronger and more centralized system and the more deversified farming by making inspection relatively less important will require juster laws to win the support of the people.

—o—

The publication of Prof. Comstock' long expected work on Entomology is announced to occur the middle of March.

DELLER, J. D

A Catalogue etc.

93.

baja Fab. c-nigrum Linn. oblata Morr rosaria Grt. sierra Harv. clemens Smith havilae Grt. piscipellis Grt N. A. atrifrons Gre A. lubricans Gn. vocalis Grt N. palidicollis Grt. pyrophiloides Harv. Chorizagortis auxiliaris Grt. introferens agrestis Grt inconcinna Harv. A. Rhizagrotis abiormis Smith proclivis Smith A. acclivis Smith A. albicosta Smith A. lagena Grt albalis Grt N. Feltia subgothica Haw. evanidalis Grt. venerabilis Walk gravis Grt. vancouverensis Grt aneipennis voluhilis Harv annexa Tr. malefida Gn Porosagrotis catenula Grt orthogonia Morr. A. dollii Grt. milleri Grt. pluralis Grt Carneades willsonii Grt. lacunosa Grt recula con.

Claviform present
Costa bright yellow ..... **auxiliaris**, Grt.
Costa dull yellow ..... **introferens**, Grt.
Costa as the rest of the wing ..... **agrestis**, Grt.
Claviform wanting ..... **inconcinna**, Harv. A.

Notes for Beginners. No 11.

Shape. — The following terms used in descriptive entomology are often misunderstood:

Arcuate. Curved
Attenuate. Much narrowed.
Clavate. Club shaped.
Cordate. Herat shdped.
Cuneate. Wedge shaped.
Emarginate. Edge with a large blunt incision.
Falcate. Sickle shaped
Incrassate. Swollen.
Lanceolate. Lance shaped.
Lobate. With rounded portions produced by deep incisions.
Lunate. Moon shaped.
Mucronate. Ending abrupitly in a sharp point.
Quadrate Square.
Reniform. Kidney shaped.
Rotundate. Round.
Sinuate. Edge strongly wavy.
Spatalate Spatula shaped.
Subulate. A curved cone.
Triquetral. Three sided
Truncate. Appearing as though cut off.

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SMITH, J. B.
93.

A Catalogue etc.

Harv. O. quadridenta G. & R. O. niveilinea Grt. A. brevipennis Smith plagigera Morr. N. ridingsiana Grt. A. flavidens Smith A. flavicoxalis Smith A. bicellaris Gr. brocha Morr. N. cogitans Smith bollenani Grt. bidavis Grt A. pertusa Grt. punctigera Wlk. N. A. atomaris Smith gagates Grt. citricolor Grt. A. moerens Grt. A. remota Smith luteola Smith A. sericornis Smith tetrica Smith N. tenuscea Harv. trifasciata Smith O. bifasciata Smith A. messoria Harr choris Harv. N. fauna Morr brunneigera Grt. incallida Smith lutulenta Smith annulipes Smith O. murdocki Smith O. quinquelinea Smith friabilis Grt fusigera Grt. orbicularis Smith N.

con,

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Hints for Teachers.

Fourth Paper.

The comparison diagram will be found useful for almost all kinds of laboratory instruction. In the simplest form it expresses the relationships of three objects thus:

Butterfly Moth. Beetle.

or the characters may expressed thus:

Scaly. — A frenulum / No frenulum

No scales.

All comparisons are primarily expressible in this way and the normal mental process involves the selection of the most significant characters. The example given above might have been expressed in this way:

No frenulum — Scaly. Butterfly / No scales, Beetle

A frenulum. Moth

Such a grouping would be very unnatural.

There are two methods of testing the accuracy of a comparison. One is the use of different characters and depending upon the preponderance of evidence to

con.

Thorax with distinctly divided anterior and posterior tufts.....
..... **saucia,** Hbn.
Thoracic tufts not divided ..... **incivis,** Gn.

Notes for Beginners. No 11.

Surface. — The following terms used in descriptive entomology are often misunderstood:

Canaliculate. With a central broad furrow.
Ciliate. Fringed with hairs.
Coriaceous. Leathery.
Corneous. Horny.
Fasciculate. Covered with bundles of long hairs.
Glabrous. Smoth, free from hairs.
Muricate. Covered with small sharp pointed elevations.
Pilose. With abundant rather short erect hair.
Porcate. With very broad and deep grooves.
Pubescent. With very fine hairs.
Rugose. With wrinkles.
Scabrous. Covered with small elevations.
Sericeous. With very small silky hairs.
Setose With long stiff hairs.
Squamose. Covered with broad flat scales.
Striate With fine parallel impressions.
Sulcate. With rather large grooves
Tesselate. Checkered.
Tomentose. With long tangled hairs.
Ventricose. Greatly swollen
Verrucose. Warty
Villose. With long erect hairs.

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No. 52 Berkeley California. Mar. 4. 1895.

5 105 LTD (5

Hints for Teachers.

Fourth Paper. con.

decide the matter. The other is the use of other objects forming a complex diagram thus:

The production of such a diagram involves a series of simple comparisons such as might be expressed by simple diagrams.

A complex diagram like the one above even if inaccurate in many details will show very plainly its unnaturalness if the grouping of butterfly moth and beetle were wrong as regards each other.

The particular utility of the diagram is the means it affords of expressing tangibly the form of reasoning employed in scientific study.

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SMITH, J. B. 93.

A Catalogue etc.

micronyx Grt. intrita Morr. vetusta Wlk. alticola Smith satis Harv. rena Smith insulsa Wlk. spectanda Smith nostra Smith furtivus Smith perexcellens Grt. colata Grt. divergens Wlk. atrifera Grt. tessellioides Grt. silens Grt. Richia chartalis Harv. Eutolype damalis Grt. Admetovia oxymorus Grt. Maniestra insolens Grt. leucogramma Grt. gnata Grt. A. crotchii Grt. liquida Grt O. prodeniformis Smith A. radix Wlk nevadæ Grt. subjuncta G. & R. O. invalida Smith trifolii Rott. n-scripta Smith cristifera Walk. O. passa Morr. glaciata Grt A minorata Smith defessa Grt. chartaria Grt. brachiolium Harv A. legitima Grt O. noverca Grt. puadrata Smith obscura con,

Subterminal line with a distinct W-mark.
Ordinary spots nearly or quite confluent ..... **crotchii,** Grt.
Ordinary spots not at all confluent
Median space darker than the rest of the wing ..... **liquida,** Grt. O.
Median space not darker than the rest of the wing
Hind wings white ..... **prodeniformis,** Smith A.
Hind wings dark
Front wings reddish brown ..... **radix,** Walk.
Front wings dark brown
Orbicular large
Transverse anterior line sinuate and dentate ..... **glaciata,** Grt. A.
Transverse anterior line very even **minorata,** Smith
Orbicular small
Claviform small ..... **nevadæ,** Grt.
Claviform large ..... **subjuncta;** G. & R. O.
Front wings dark ashen gray ..... **invalida.** Smith.
Front wings dirty yellow ..... **trifollii,** Rott.
No distinct W-mark in the subterminal line
Color pale dirty yellow gray or green and without reddish
Ordinary spots very indefinite ..... **leucogramma** Grt.
Ordinary spots distinct
Orbicular oval, oblique ..... **cuneata,** Grt.
Orbicular round
Reniform outlined with white
Orbicular large ..... **insolens,** Grt.

con.

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No. 53 Berkeley California. Mar. 5. 1895

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Zoological Section.

At the last meeting of the Zoological section of the Science Association of the University of California Mr Woodworth spoke upon the color pattern of the wings of butterflies. He traced the homologies between the markings of a number of our common butterflies and elaborated a general theory to account for them.

The color differentiation is due to differences in nutrition of the scale cells during the latter part of their development, and this in turn is due in a great measure to the conformation of the wing case of the pupa.

—o—

We have just received a paper on scale insects from Prof. W. G. Johnson formerly of Stanford University. He is now at the University of Illinois.

—o—

It is with deep regret that we learn that the Secretary of Agriculture proposes to discontinue the publication of Insect life at the end of the current volume. We hope he may be induced to reconsider the matter.

—o—

SMITH, J. B.

A Catalogue etc.

93.

Smith A. stricta Walk. spiculosa Grt. A. circumcincta Smith olivacea Morr. rectilinea Smith incurva Smith A. 4-lineata Grt. laudabilis Gn alboguttata Grt. cuneata Grt. vicina Grt. pensilis Grt. Scotogramma submarina Grt. umbrosa Smith A. Heloneche niveiguttata Grt. Luperina passer Gn O. burgessi Morr. Xylophasia finitima Gn. O. laterilia Hfn cogitata Smith devastatrix Brace albina Grt pluviosa Walk. occidens Grt. perpensa Grt. cucullformis Grt cariosa Gn. A. antennata Smith cinefacta Grt. centralis Smith auranticolor Grt. O. A. lignicolor Gn. genialis Grt Hadena evelina French violacea Grt. adnixa Grt. paviæ Behr. binotata Walk. generosa,

Orbicular small ..... albogutta, Grt.
Reniform outlined with black
Color green ..... laudabilis, Gr.
Color yellowish gray
Reniform dusky beneath ..... chartaria, Grt.
Reniform not dusky beneath ..... defessa, Grt.
Color dark gray or brown or reddish
Orbicular wanting ..... u-scripta, Smith
Orbicular present
Reniform outlined with pale
Orbicular outlined with pale
A pale spot near the hind angle of the front wings .....
..... gnata, Grt. A.
No pale spot near the hind angle ..... spiculosa, Grt A.
Orbicular not distinctly defined
Hind wings darker outwardly ..... legitima, Grt O.
Hind wings even smoky brown ..... quadrata, Smith
Orbicular outlined with black
Claviform wanting ..... novercа, Grt.
Claviform distinct ..... circumcincta, Smith
Reniform outlined with black
Orbicular round
Hind wings dark
Claviform distinctly outlined ..... cristifera, Walk. O.
Claviform faintly indicated or wanting .....
..... brachiolum, Harv. A.
Hind wings pale

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o. 54 Berkeley California. Mar. 6. 1895.

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Life History Notes.

A most valuable kind of note taking is that connected with an attempt to follow the life histories of insects in the field.

A useful book for this purpose is the small vest pocket note book with quadrille ruling to be had at any Stationers.

A page is devoted to each species and a square to each day. The arrangement may be as follows:

Name.....

	J	F	M	A	M	J	J	A	S	O	N	D
1												
2												
3												
4												
5												

etc.

The entries are made in the appropriate square as follows:

a. adults.
c. copulation.
d. deposition of eggs
e. eggs.
h. hatching of eggs.
l. larvæ or n. nymph.
m. moulting
p. pupa.

Other letters may be used for

con.

A Catalogue etc.

trix Grt. N. characta Grt. A. N. indirecta Grt divesta Grt. tusa Grt. tonsa Grt. N. marina Grt. smaradina Neum. A. Pseudanartia flava Grt O. N. A. singula Grt A. falcata Neum. A. Perigea falsa Grt. albolabes Grt A. loculosa Grt A. dilecta HEdw. A. continens HEdw. A. benigna HEdw. A. mersa Morr. Valeria opima Grt. Homohadena insconstans Grt. A. figurata Harv. chorda Grt. vulnerata Grt. A. Oncocnemis hayesi Grt. mirificalis Grt. levis Grt. A. behrensi Grt pernotata Grt A. occata Grt meadiana Morr. A. fortis Grt. major Grt oblita Grt. N. gracillima Grt. A. atricollaris Harv. A. griseicollis Grt. A. aterrima Grt. Apeorphyla yosemitæ Grt. Lathosea con.

Transverse posterior line obsolete above
Claviform large ..... **passa**, Morr.
Claviform wanting ..... **obscura**, Smith A.
Transverse posterior line complete
Reniform upright
Transverse posterior line gently curved below the reniform ..... **egens**, Walk.
Transverse posterior line incurved below the reniform ..... **olivacea**, Morr.
Transverse posterior line straight below the reniform ..... **rectilinea**, Smith
Reniform oblique
Clasper pointed at tip ..... **vicina**, Grt
Clasper inflated at tip ..... **pencilis**, Grt.

Notes for Beginners. No 12.

Veination in Diptera. — In this Order the longitudinal veins are numbered from before backward. The veins arise from two principal trunks. The third longitudinal vein which is the hindermost vein of the first trunk is almost always connected with the fourth longitudinal vein by a crossvein called the anterior or small crossvein. This crossvein is the key to the whole wing structure. Towards the body is the first basal cell and beyond the crossvein is the first posterior cell. Above the third longitudinal vein is the submarginal cell or cells and below the fourth longitudinal vein a cell known as the discal cell is usually present. A few other terms need explanation; the posterior or great crossvein is the one closing the discal cell, the anal cell is the third basal cell and the posterior basal cell closes it.

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Life History Notes, con.

indicating other items and numerals to indicate the accessions of preserved matarial, or to refer to more extensive notes.

If a square becomes crowded the note may be made on the margin and connectet with the proper square with a line. It would be well to leave the opposite page for such notes.

Another arrangement may be made with a wider that has the advantage of not separating so widely the last of one month and the first of the next, thus:

Name	Jan.																Feb														
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
etc.																															

SMITH, J. B.

A Catalogue etc.

pullata Grt. O. Trichopolia dentatella Grt A. ptilodonta Grt A. Polia theodori Grt. olorina Grt. Actinotia stewarti Grt. Laphygma flavimaculata Harv. Prodenia ornithogali Gp. eudiopta Gn. praefica Grt. Dargida procincta Grt. Euplexia lucipara Linn. Nephelodes minians Gn. Trichotta Grt. fistula Harv. inconspicua Grt. Hydroecia lunata Smith Gortyna sauzalitæ Grt. Pota armata Grt. A. minorata Grt. A. Leucania bicolorata Grt. A. dia Grt. fareta Grt. Zosteropoda hirtipes Grt. Ufeus saggitarius Grt. plicatus Grt. Eucalyptera obscura Grt. Fotella notalis Grt. A. Caradrina mirandra Grt. fragosa Grt. A. extimia Wlk. Amphipyra tricuetra Grt. A. con,

Three submarginal cells
No spurs at the end of the hind tibiæ..... **Apis.**
With spurs at the end of the hind tibiæ
First discoidal about as long or shorter than the marginal cell
Second submarginal cell longer than the first or third
Hind tibiæ of the female flattened..... **Bombus**
Hind tibiae of the female convex..... **Apathus.**
Second submarginal cell longer than the first but shorter than the third..... **Xylocopa.**
Second submarginal cell shorter than the first or third
Maxillary palpi six jointed..... **Synhalonia.**
Maxillary palpi five jointed..... **Xenoglossa.**
Maxillary palpi four jointed..... **Mellisodes.**
First discoidal distinctly longer than the marginal
Marginal cell atleast one half as long as the first discoidal
Third submarginal cell as wide above as below..... **Anthophora.**
Third submarginal cell narrower above than below
Apex of marginal cell touching the costa
Thorax densely pubescent..... **Habropoda.**
Thorax nearly bare..... **Nomada.**
Apex of marginal cell not touching the costa **Epiolus.**
Marginal cell less than one half as long as the first discoidal
Scutellum with two tubercles..... **Melecta.**
Scutellum with two spines **Bombomelecta.**
Two submarginal cells
Marginal cell long

con.

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DAILY POST CARD.

A Californian Journal of Entomology.

No. 56. Berkeley California. Mar. 8. 1895.

Fungus Flies.

One of the most interesting papers that has appeared this year is one by Prof. A. D. Hopkins of the West Virginia Experiment Station on the habits of certain Mycetophylidæ.

He shows that one produces a serious form of potato scab in West Virginia Heretofere these insects have been supposed to feed exclusively on fungi

The female insect is wingless and two forms of males are produced. a long winged and a short winged kind.

The wingless female enters the earth and deposits her eggs on the potato tuber. The larvæ feed on the tissue of the potato. These when full fed pupate in a cocoon in the soil.

The insects of this family have been almost almost entirely neglected by entomologiss of this country.

One species in this State is often looked upon as causing the crown knot when found in a decaying knots. and another which feeds on the rose rust is sometimes charged with causing this disease also.

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Smith, J. B.
A Catalogue etc.
Orthodes virgula Grt. A. puerilis Grt. Tæniocampa furfurata Grt. pebrunnea Grt. uniformis Smith A. culea Gn. A rutila Grt. perforata Grt. A curtica Smith sulfusa Smith A. obtusa Smith A. pectinata Smith a dedenda Smith terminata Smith sublistella Grt. O. arthuriana Harv. pacifica Harv. prasos Grt. Stretchia normalis Grt. inferior Smith plusiiformis HEdw. N. nanaima Grt. O. behrensiana Grt pulchella Harv. erythrolita Grt. Perigaphia prima Smith Perigonica angulata Smith Trichocolea edwardsii Smith decepta Grt. A. antica Smith Trichocosmia biornata Grt. A. Metalepsis ornata Grt. Pseudoglaea blanda Grt. Pseudorthosia xerialis Grt. Xylina con, 93. (9.)

Third discoidal cell not narrowed above
Marginal cell pointed at tip
Second recurrent vein reaching beyond the tip of the second submarginal cell or uniting with the third transverso-cubital vein
Abdomen of the female with a dense scopa beneath.. ..... **Anthidium.**
Abdomen of the female with no scopa beneath..... ..... **Stelis.**
Second recurrent vein ending opposite the second submarginal cell
Stigma short, poorly developed
Tip of marginal cell not touching the costa
Pulvillus of the female wanting
First joint of hind tarsi flattened..**Megachile.**
First joint of hind tarsi long and slender .... **Lithurgus.**
Pulvillus present in both sexes..... **Osmia.**
Tip of marginal cell touching the costa..... ..... **Chelostoma.**
Stigma lanceolate and well developed
Head broad..... **Panurgus.**
Head nearly square..... **Heriades.**
Marginal cell narrowly truncate at tip .... **Calliopsis.**
Third discoidal call narrowed above.... **Phileremus.**
Marginal cell short..... **Perdita.**

This family is well reqresented in this region, and includes most of our bees.

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The synopses form a key for identifying our species.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 57. Berkeley California Mar. 9. 1885.

SMITH, J. B. 93. (10.)

A Catalogue etc.

tranquila Grt. Calymnia orina Gn. Atethmia canescens Behr Cea immaculata Grt. Cleoceris elda French retifascia Smith curvifascia Smith Orthosia purpurea Grt. hamifera Grt. citima Grt. immaculata Morr. Glaea olivata Harv. Orrhodia californica Smith Scolioptrix libatrix Linn. Litholomia napae Xylina gauspata Grt. contenta Grt. oregonensis Harv. carbonaria Harv. Morrisonia bisulca Grt. A. perabuta Morr. confusa Hbn. Xylomiges biennalis Grt. peritalis Smith O simplex Wlk. curialis Grt. rubrica Haav. perlubens Grt. ocharacea Riley patalis Grt. Pleroma obliquata Smith Calocampa cinereitia Grt. O. curvimacula Morr. O. Cleophana eulepis con.

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Pinning Labels.

Paper labels should hold firmly to the pin and be perfectly flat and horizontal To secure these qualities special care must be exercised in the process of pinning. The crudest way is to let the point of the pin pass between the fingers. Nearly as good results can be had in this way as by any method but one is very apt to make a bad job of it.

A very satisfactory gauge for pinning may be made as follows; Obtain from a printing office a quantity of trimmings of a width equal to the height the label is to be above the point of the pin. Now take two strips of wood of the same width and screw them together firmly with the paper between. It may now be sawed off to the desired length and is ready for use.

To use place the label upon the edges of the paper in the gauge and the pin can be readily pushed through it. The papers will keep the pin perpendicular to the label in one direction and it must guided by by the eye in the other.

Scutellum a quarter to a fifth the length of the elytral suture
.....**hamatus,** Say O.
Scutellum only an eighth or a tenth the length of the elytral suture
Apex of hind tibiae fimbriate with short equal spinules
Head more or less tuberculate
Clypeus quadriangulate or quadridentate.....
.....**conspersa,** Horn
Clypeus emarginate sometimes biangulate
Mesosternum not carinate between the coxae
Only the club of the antennae black
Intervals on elytra flat.....**congregatua.** Mann.
Intervals of elytra convex.....**aleutus,** Esch.
Antennae all black .....**pectoralis,** Lec.
Mesosternum carinate.....**granarius,** Linn.
Head not at all tuberculate
Mesosternum not carinate between the coxae
Clypeus with a tooth on each side of the feeble emargination.....**rugifrons,** Horn
Clypeus feebly emarginate but not toothed
Basal marginal line of thorax distinct.....
.....**consociatus,** Horn
Basal marginal line visible only at the sides
Second and fourth interval rugose **subæneus,** Lec.
Second and fourth interval not different from the others in structure.....**alternatus,** Horn
Mesosternum carinate

con.

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Berkeley as second-class matter.
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THE ENTOMOLOGIST'S

DAILY POST CARD.

A Californian Journal of Entomology.

No. 58. Berkeley California. Mar. 11. 1895.

Smith, J. B. 93. (11.)

A Catalogue etc.

Grt. antipoda Strck A. Cucullia lactifica Lint. A. serraticornis Lint. solidaginis Behr. Ingura declinata Grt. Behrensia conchiformis Grt. Deva palligera Grt. Plusia metallica Grt. arizona French A. putnami Grt biloba Steph. labrosa Grt. gamma Linn. on Gn. Brassicæ Riley lenzi French celsa HEdw. O. pasiphaeia Grt. Lepipolys perscripta Gn. Basilodes chrysopis Grt A. territans HEdw. A. howardi HEdw. A. mirabilis Neum. A. Stiria sulphurea Neum. Stibadium aureolum HEdw A. curiosum Neum. A. Plagiomimidus viridifera Grt. A. Fala ptycophora Grt. Acopa incana HEdw. A. pacifica HEdw. A. Neumœgenia poetica Grt. O. A. Anaplaga sexseriata con,

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Names of Colors.

Every one who has attempted to determine insects in groups in which the pattern is an important matter, has been impressed with the indefinite way in which the names are applied. In attempting to describe such insects one has the similar experience of realizing the inadequacy of the ordinary nomenclature of colors for expressing intelligibly and accurately what one sees.

The same difficulty is experienced in the business circles. There has recently been perfected for commercial purposes a plan which will doubtless become widely adopted for scientific work. The method as described in a recent number of the Scientific American consists in the use of a set of disks of standard coloes, from which all colors may be made by combinations of these in different proportions.

The blending is done by rapidly revolving the disks after slipping them over each other in the right proportions.

For the standard colors the

con.

Clypeus dentate on each side of the emargination . . . . . **nevadensis,** Horn

Clypeus angulate on each side of the emargination . . . . . **gentilis,** Horn

Clypeus rounded on each side . . . . . **cribratus,** Lec.

Apex of hind tibiæ fimbriate with unequal spinules

Elytra opaque

Elytral intervals flat . . . . . **opacus,** Lec

Elytral intervals convex . . . . . **decipiens,** Horn N.

Elytra shining

Thorax not narrower at base than at apex

Side margins of thorax explanate

Elytral intervals convex . . . . . **marginatus,** Lec. N.

Elytral intervals nearly flat . . . . **ochreipennis,** Horn

Side margins of thorax not explanate

Head and thorax reddish or yellowish

Clypeus denticulate on each side of the emargination

Punctures of elytral intervals coarser than those of the striæ . . . . . **militaris,** Lec.

Punctures of elytral intervals not as coarse as those of the striae . . . . . **æmulus,** Horn A

Clypeus angulate on each side of the emargination

Elytral intervals smooth . . . . . **rubidus,** Lec.

Elytral intervals punctured . . . . . **rubiginosus,** Horn A

Head and thorax mostly black

con.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 59. Berkeley California Mar. 12. 1885.

SMITH, J. B. 93. (12.)

A Catalogue etc.

Grt. composita HEdw. A. thoracica HEdw A. Grotella dis Grt Oxyenemis advena Grt. A. Copablepharon absidum Harv. album Harv. O. Adophron pallens Tepper Chloridea virescens Fabr. Heliothis armiger Hbn. phlogophagus G. & R. Chamaclea pernana Grt. A. Rhodosea julia Grt Triocnemis saporis Grt. Schinia velaris Grt. tenuescens Grt. A. obliqua Smith A. bifasbia Hbn. A. acutilinea Grt. N. balba Grt. A. coercita Grt. A. walsinghami HEdw. O cupes Grt packardii A. Grt. errans Smith Stylopoda cephalica Smith Synylistis proprius HEdw. Pseudotamila vanella Grt. Melaporphyria oregona HEdw. O. N. Melicleptria celeris Grt. pulchriornis Grt.

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Names of Colors. [con.] following pigments were selected: English vermilion, Mineral orange, Light chrome yellow' Emerald green, and Artificial ultramarine blue

Disks of drawing paper are painted with these pigments mixed up in solutions of gum arabic solutions. These will be found to correspond to the following degrees of the spectrum; Red 644, Orange .614, Yellow .585, Green .521, and Blue 422.

In addition to these black and white disks are used to give tones and shades. Each disk is cut on one side radially to admit of overlapping. Behind the disks one slightly larger than the others and divided into a hundred divisions enables one to readily read off the percent of each color in any given combination or the same thing may be accomplished by graduating each disk on teh back and reading the exposed portions. Notice that the amount of one exposed below corresponds with the amount of the next number exposed above.

The best method of blending

con.

Clypeus denticulate on each side of the emargination ..... **dentiger,** Lec. A.
Clypeus angulate on each side of the emargination .. .. **luxatus.** Horn
Clypeus rounded on each side of the emargination
Thorax pale at the front angles
First joint of hind tarsi longer than the second and third together ..... **paradalis,** Lec.
First joint of hind tarsi shorter than the second and third together ..... **inutilis,** Horn
Thorax all black ..... **cruentatus,** Lec. A.
Thorax narrower at base than at apex
Clypeus denticulate on each side of the emargination ... . **oblongus,** Say A.
Clypeus rounded on each side of the emargination
Mesosternum carinate between the coxae .... **sparsus,** Lec.
Mesosternum not carinate between the coxae .... **ovipennis,** Horn

This genus includes some of the most abundant insects of the family. They are small insects and feed upon dung.

The Diabrotica.

The common Diabrotica soror is one of the worst of our insect pests, living as it does on such a variety of food plants and becoming wonderfully abundant and moreover having the habit at certain times of concentrating their attacks upon a single crop they are capable of doing enormous injury. Their life history is not known. Every one should be on the lookout for their larvae.

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THE ENTOMOLOGIST'S

DAILY POST CARD.

A Californian Journal of Entomology.

No. 60. Berkeley California. Mar. 13. 1895.

(13.)

93.

Smith, J. B.

A Catalogue etc.

grueiana Tepper villosa Grt. honesta Grt. O. sueta Grt. vaccinia HEdw. Heliolonche modicella Grt. Hellosea pictipennis Grt. Heliophana amaryllis Smith Xanthothrix ranunculi HEdw. neumoegeni HEdw. Axenus arvalis Grt. Heliaca diminutiva Grt. dubitans Tepper N. nexilis Morr. Anartia kelloggi HEbw. minuli Behr Annaphila diva Grt. casta HEdw. O. superba HEdw. divinula Grt germana HEdw. decia Grt. depicta Grt. salicis HEdw. lithosina HEdw. nuera Harv immerens Harv. danistica Grt. pustulata HEdw. A. dominia HEdw. aurantiaca HEdw. Trichotarache assimilis Grt Acontia flavipennis Grt. expolita Grt. A. sutrix Grt. N. arizonæ HEdw. sedata con,

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Names of Colors. [con,] is by means of some such apparatus as is used for this purpose in physical laboratories.

Very satisfactory results are obtained by a very simple devise that may be constructed by any one. The material needed consists of a piece of slate pencil about an inch and a half long and a small cork. With a cork cutter or with a red hot wire drill a hole through the cork just large enough to allow it to fit tightly over the pencil. Now with a sharp knife cut the cork in two squarely at about the middle.

The slate pencil is thrust through the middle of the disks and a piece of the cork slipped on at both ends and pushed tightly against the disks holding them firmly in position.

The top thus formed is spun by the fingers. If spun on a plate or other smooth surface it will spin a long time and the blending is perfect.

The record of the determination could be expressed as follows: "Color green (Y10 G65 W25) with a brown (N80 R20) median line."

Clypeus subangulate or denticulate on each side of the median emargination

Marginal line of hind femora deep and entire..... **lucanus,** Horn L.

Marginal line deep and half the length of the femur..... **lævipennis,** Horn A.

Marginal line very short or absent

First joint of hind foot as long as the long spur

Thorax punctured from base to apex..... **abditus.** Hald.

Thorax nearly bare infront..... **texanas,** Harold A.

First joint of hind foot shorter than the long spur.

Abdomen with very few punctures..... **desertus,** Horn

Abdomen coarsely punctured..... **inops,** Horn A.

Clypeus feebly emarginate, the angles on each side rounded

Hind tibiæ without accessory spinules..... **gracilis,** Mels.

Hind tibiæ with accessory spinules

Abdomen coarsely punctured from side to side..... **oblongus,** Horn

Abdomen coarsely punctured at the sides, nearly smooth in the middle

Elytra smooth, not pubescent

Elytra truncate at base..... **californicus,** Horn

Elytra emarginate at base..... **lobatus,** Horn L.

Elytra with short erect hairs..... **hirsutus,** Horn A.

This genus is very much like Aphodius in structure and habits.

—o—

Corrections. — The publishers would be glad to receive notice of ommissions and errors occurring in these synopses.

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No. 61. Berkeley California Mar. 14. 1885.

Hints for Teachers.

CATERPILLARS by M. W. T

Collect different kinds of caterpillars, keep them in pasteboard boxes feeding them with the food upon which they were found. Make drawings and descriptions following up the life histories of the insects. Note the quantity of food taken and compare the length of time spent in the chrysalis stage in each species. Do this with all the caterpillars found.

Study the mouth parts, eyes, and antennae. Note the number of segments to the body and the number and kinds of legs. Why has a caterpillar so many legs? Which are the true walking legs? Of what use are the other legs?

Study the chrysalis. Why does it take no food? Is it alive or dead? What parts of the perfect insect can be seen in the chrysalis. Make drawings of the chrysalis. How does the insect emerge from the chrysalis? In what position were the wings legs and antennae while the insect was a chrysalis? Were they the same size?

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SMITH, J. B. 93. (14.)

A Catalogue etc.

HEdw. A. elegantula Harv. N. A. binocula Grt. A. Azenia implora Grt. A. edentata Grt. A. Escania clauda Grt. A. Fruva acerba HEdw. modesta HEdw. N. parvula Wlk. A. Xanthoptera clausula Grt. A. subcinnalis Hulst A. Spaguela magnifica Grt. A. funeralis Grt. A. Prothymia plana Grt. A. Erastia distincta Grt. A. propria Grt. A. Thalpochares carmelita Morr. fortunata Grt. A. perita Grt. A. Tripudia basicinerea Grt. A. lixiva Grt. A. Gyros nuttii HEdw. Drasteria caerlea Grt. Caenurgia adversa Grt. Enclidia annexa HEdw. O. Synedoida cervina HEdw. A. biformata HEdw. scrupulosa HEdw. insperata Grt. A. mucronata Grt. A. aegrotata con.

Libellulidæ. Pseudoneuroptera.

Front and hind wings alike, eyes pedunculate
  Median and subnodal sectors arise nearer the arculus than the nodus.....**Lestes.**
  Median and subnodal sectors almost under the nodus
    Bristles on the legs twice as long as the distance between them.....**Argia.**
    Bristles on the legs short
      No spine at the end of the eighth segment of the female
        With two post ocular spots.....**Agrion.**
        With no post ocular spots.....**Pyrrhoroma.**
      A spine at the end of the eighth segment of the female
        Tenth segment of the male not prolonged above.....**Enallagma.**
        Tenth segment of the male a little prolonged above
          Lower sector of triangle arising before the basal postcostal vein.....**Ischnura.**
          Lower sector of triangle arising at the basal postcostal vein.....**oxyagrion.**
Front and hind wings dissimilar, eyes not pedunculate
  Antecubital cells of the first and second series not corresponding except at base
    Eyes remote
      Labium bifed.....**Tachyopteryx.**
      Labium entire
        Triangle with transverse veins.....**Progomphus.**
        Triangles without transverse veins
          Wings flavescent at base.....**Herpetogomphus.**

con.

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DAILY POST CARD.

A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 62. Berkeley California. Mar. 15. 1895.

(15.)

SMITH, J. B. 93.

A Catalogue etc.

HEdw. A Litocala sexsignata Harv. Syneda divergens Behr alleni Grt. N adumbrata Behr socia Behr A. ochracea Behr nitrifica HEdw. N. tejonica Behr nubicola Behr maculosa Behr hastings-i HEdw. bowlandi Grt. perplexa HEdw. A. edwardsii Behr Cirrhobolina mexicana Behr A. perteta HEdw. A. tetrica HEdw. Meliportis hademiformis Behr perlita HEdw. A. Caocala cheilonia Grt. A. andromache HEdw. delilah Strk. verrilliana Grt. ilia Cram. abolibah Strk. nuamorata Edw. stretchii Behr faustina Strk. mariana HEdw. electilis Wlk. anatrix Hbn. A. junctura Wlk babayaga Strk. A. relicta Wlk. O elda Behrens O. piatrix Grt. A. Phoberia indiscreta HEdw. Phurys

con.

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Types.

In the early history of science the description or definition made the species or other group, but natural groups so continuously over step the artificial boundaries of definition that it was not long before the idea of types arose. This idea arose first in the larger groups where the definitions were naturally the most faulty. The original idea of a type was a sort of a generalized idea of the commoner forms. This has been gradually developing and becoming more concrete till now the type of a family is a single genus, of a genus a single species etc.

The type of a species is now recognized as all the specimens in the hands of the describer at the time the description is written This has resulted in a number of instances in the so called types of a species actually belonging to more than one species. Every reason that applies in the case of a genus or family may be used as evidence of the desirableness of single type for each species. Collateral types are desirable but there

con.

Wings not flavescent at base
Thorax almost wholly greenish, femora mostly yellow ..... **Ophiogomphus.**
Thorax with distinct dark markings, legs mostly black
Dorsum of thorax with a single median yellow spot ..... **Octogomphus.**
Dorsum with lateral yellow or golden stripes ..... **Gomphus.**
Eyes touching at a single point ..... **Cordulegaster.**
Eyes touching for some distance ..... **Anax.**
Antecubital cells of the first and second series corresponding
Eyes tuberculate behind ..... **Macromia.**
Eyes not tuberculate behind
Hind lobe of prothorax large, bilobed
Abdomen broad ..... **Mesothemis.**
Abdomen slender ..... **Diplax.**
Hind lobe of the prothorax small, entire
Sectors of arculus pedicellate ..... **Dythemis.**
Sectors of arculus not pedicellate ..... **Libellula.**

This family is usually divided into some half dozen groups of family rank. The insects constituting the group are commonly known as dragon flies. They live in the water till they attain their wings and they feed on other insects during their whole life

New Species. — Papers containing descriptions of new species having been offered for publication in the Post Card we will say that it will not be our policy to publish new species

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THE ENTOMOLOGIST'S

DAILY POST CARD.

A Californian Journal of Entomology.

No. 63. Berkeley California Mar. 16. 1885.

SMITH, J. B. 93. (16.)

A Catalogue etc.

ovalis Grt. A. Pleonectyptera bisorialis Grt. A. incusalis Grt. A. subflavidalis Grt. A. Traana griseipennis Grt. A. Capnodes californica Behr Agassiza urbicola Behr. Erebus odora Linn. Phaeocyma umbrina Grt. A. termina Grt. A. Homoptera lunata Dru rosae Behr calycanthata S. & A. salicis Behr Eubolina mima Harv. A. Yrias clientis Grt. A. voluceris Grt. A. repentis Grt. A. crudelis Grt Matigramma rubrosuffusa A. Hyamia punctipennis Grt. A. Hormisa linearis Grt. A. Salia rufa Grt. A. Rivula tripla Grt A Heterogramma palligera Smith Pseudorgyia russula Grt. A. Hypena californica Behr decorata Smith

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Types. con. should be one court of final appeal. The replacing of lost or destroyed types should be provided for by giving the collateral types a designated rank so that if the first type is destroyed the second becomes the type and the third the heir apparent.

Typical specimens are those compared with the type and found to agree very closely with it, and authentic specimens are those named by competent authority. Public museums should have on exhibition authentic, typical specimens but types should be accessible only to specialists.

—o—

University of California Entomological Society.

There will be a meeting of the Society in the Entomological Laboratory Friday March 22nd. at 4.40 P.M. Each member will be expected to present an observation. Any one interested is invited to attend.

—o—

It appears that a scale allied to our common brown apricot scale has become quite abundant in New York.

Carina of pronotum intersected by but one sulcus
Apical third of tegmina obscurely spotted..... .....
....**californicus**, Scud
Apical third of tegmina spotted as distinctly as the rest.....
....**marmoratas.** Scud.
Carina of pronotum intersected by two sulci
Apical virreous area of wing large, occupying at least four lobes
Metazona tumid centrally
Intercalary and median veins very close together near the tip
Metazona distinctly less than two times as long as the prozona
Basal two thirds of hind femora blue within.....
.....**corlipos**, Hald. A. N.
Inside of hind femora all red.....**zapotectus**, Scud.
Metazona twice as long as prozona
Dark band of wings hardly touching the margin.....
.....**eremitus**, Scud. A.
Dark band of wings touching the margin for atleast half its course .....**pardalinus**, Saus.
Intercalary and median veins no where very close together
Dark spots of tip of of tegmina small, not occupying more than half the area
Rugosities of pronotum irregularly distributed
Outlines of spots on tip of tegmina well defined.....
con.

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No. 64. Berkeley California. Mar. 18. 1895.

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WILLISTON S. W.

83.

On the North American Asilidæ (Dasypogoninæ, Laphrinæ), with a new genus of Syrphidæ.

Trans. Am. Ent. Soc. Vol. IX pp. 1-35 Pl. I-II.

Myelaphus nodes Bigot rufus Willis.* tobiornis OS Trichs tagax Willis.* Halteropogon bilineatus Willis.* Dicolonus simplex Loew Cyrtopogon dubius Willis.* O. gibber Willis.* Pyenopogon irritatus OS. Anisopogon lautus Loew Nicodes abdominalis Willis.* Lestomyia sabulonum OS. fraudiger Willis.† Dasyllis columbica Walk. O. Laphria vultur OS. anthrax Willis.† bilineata Walk. francisceana Bigcon.

Remedies for Diabroticas.

While the Diabrotica is an unsatisfactory insect to attempt to destroy it is not wholly uncontrolable. Perhaps if we knew more of the life history of these insects it might become comparatively easy.

In the flower garden the daily use of a sweep net will enable one to destroy a large enough proportion of the beetles to greatly decrease the amount of injury.

For protecting the orchard the problem is more complex. The use of the sweep net will generally not be profitable. It may be that jarring the insects from the tree on to a sheet each morning after they have begun to eat the fruit, would be found to pay. For this purpose the sheet could be stretched over a frame attached to a wheelbarrow and with a slit for the trunk so it may be brought under the tree. The jar may be given with a mallet well padded so as not to injure the bark.

The most promising measure however is the use of Paris green to poison the beetles.

con.

.....**maculatus**, Scud. A.

Outlines of spots on tip of tegmina irregular and ill defined.....**affrictus**, Scud. A.

Rugosities of metazona arranged somewhat into lines parallel to the sides of the process.....

.....**tigrinus**. Scud. Ar

Dark spots of tip of tegmina large occupying quite three fourths of the area.....**paradoxus**, Thom. A.

Metazona plane above

Antennæ of females almost as long as pronotum.....

.....**capidus**, Scud. A.

Antennæ of female considerably shorter than the pronotum.....**pumilus**, Scud. A.

Apical vitreous area small, scarely ever occupying more than two lobes

Median carina of pronotum almost obliterated between the sulci

Tip of tegmina distinctly mottled..**aurilegulus**, Scud.

Tip of tegmina very faintly marked

Hind tibiæ yellow.....**albulus**, Scud A.

Hind tibiæ red.....**stigmosus**, Scub.

Median carina distinct between the sulci

Hind margin of the sides of the pronotum curving backwards.....**neglectus**, Thom.

Hind margin of the sides of pronotum vertical

Lateral canthi almost confined to metazona

Vertical fastigium shallow.....**montanus**, Thom. A con.

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No. 65. Berkeley California Mar. 19. 1885.

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Williston S, W. 83.
On the North American Asilidæ etc.
xanthippe Willis.† O. pubescens Willis.† O. Andrenosoma fulvicaupa Say Dasypogon quadrinotatun Bigot Stenopogon albibasis Bigot Anisopogon vespoides Bigot Holopogon nitidiventris Bigot Leptogaster scapularis Bigot

Remedies for Diabroticas.

con.

This of course can not be applied to the ripe fruit for fear of rendering the fruit poisonous to human beings as well as to the insects. During the greater part of the year the beetles feed chiefly on the leaves of plants. They also have great preference for certain plants notably certain varieties of peaches and apricots. On such plants it is possible to destroy a great number of the beetles by keeping the plants dusted with the insecticide. If there are no plants about which are particularly chosen by the insect it would be profitable to plant something for traps. For a large number of insects the use of decoy plants is the most promising method of treatment. I believe that nurserymen will find it to their advantage to develope varieties or strains which are peculiarly susceptible to the diabrotica for instance for use decoy plants.

Another less promising method is the use of crushed and poisoned fruit covered with a as net to exclude bees

Vertical fastigium deep

Rugosities arranged somewhat in transverse lines on front part of metazona .... **lateralis,** Saus. N

Rugosities irregularly arranged.. **calthulus,** Saus.

Lateral canthi straight and continuous.....

..... **vitellinus,** Saus. N.

In the above synopsis instead of marmoratas and corlipes read marmoratus and coralipes. These are the heavy bodied colored winged grasshoppers.

Notes for Beginners. No 13.†

Veination in Hymenoptera. —

Cells. — Begining at the front edge at the base the cells are named costal (often wanting), median, submedian, and anal. Towards the tip the large cell [sometimes divided by a crossvein into two] is called the marginal and the row of cells below and adjacent to it the submarginals. The apical cells include the one at the anal angle and generally one above it. The remaining cells are called the discoidals.

Veins — The veins arising from the base are the costal, subcostal, externo-median and anal nervures or veins. The vein bounding the marginal cell below is the marginal or radial vein and the cubital vein bounds the submarginal cells below. The crossveins include the basal vein closing the median cell, the transverso-median closing the submedian cell, the transverso-cubitals above the cubital vein and the recurrent veins below it. The discoidal vein is the one passing between the discoidal cell and ending in the anal vein. The subdiscoidal extends from this vein to the edge of the wing.

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No. 66. Berkeley California. Mar. 20. 1895

VAN DYKE, E. C.

Notes on some of the butterflies of the Yo-Semite valley and adjacent region.

Zoe. Vol. III. pp 237-241.

92.

Papilio rutulus Bdv. eurymedon Bdv. daunus Bdv zolicon Bdv. indra Reak. Parnassius clarius Evers. Pieris sisymbri Bdv Neophasia menapi Feld. Anthocharis ausonides Bdv. Colias eurytheme Bdv. behrii Edw. Danais archippus Fabr Heterochroa californica Bdv. Limenitis lorquini Bdv. Argynnis monticola Behr zerene Bdv. leto Behr. egleis Bdv. epithore Behr. Melitæa palla Bdv leanira Bdv. quino Behr con.

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University of California Entomological Society.

There will be a meeting of the Society in the Entomological Laboratory, Friday, March 22nd at 4.40 P. M. Each member will be expected to present an observation. Any one interested is invited to attend.

—o—

A large number of copies of this issue will be sent to those who are not subscribers to the Post Card in order to give wider circulation to the letter on the other side. Every one who receives a copy of this issue should communicate with the Station at once.

—o—

In this connection attention might be called to the Post Card itself. No one interested in the insects of the pacific coast can afford to do without it. Back numbers will be supplied those subscrebing now.

—o—

Prof. Comstock has returned again to Cornell University.

—o—

The State Board of Horticulture has been continued in spite of much opposition.

Hind coxæ separated
Sides of elytra widely inflexed.....**Amblychila.**
Sides of elytra narrowly inflexed.....**Omus.**
Hinb coxæ touching
Third joint of maxillary palpi longer than the fourth.....**Tetracha.**
Third joint of maxillary palpi shorter than the fourth.....**Cicindela.**

These beetles are all of medium or large size. They are strictly predaceous in their habits. Some are brilliantly colored.

Insects of the Apple and Pear.

University of California.
Agricultural Experiment Station.

The Department of Entomology of the Experiment Station is engaged in a special study of the insects and other diseases of the apple and pear We desire the cooperation of interested parties in all parts of this and adjoining States. Will you send me a list of the injurious insects, fungi and other diseases in your vacinity? Indicate their relative destructiveness and append whatever observations you may have made regarding them. Proper credit will be given in the publications of the Station for the facts contributed. Points about which information is particularly desired are: the time of the year the injury is chiefly done in your locality, the relative amount of injury to different varieties of trees, and your local experience with remedies.

C. W. Woodworth
Berkeley Calif

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VAN DYKE, E. C.

92.

Notes on some of the butterflies etc.

Phyciodes mylitta Edw. Vanessa antiopa Linn. Pyrameis cardui Linn. carye Hbn. huntera Fabr. Junonia cœnia Hbn. Chionobas invallida Mead. Chrysophanus helloides Bdv. arota Bdv. cupreus Edw. Thecla melinus Hbn. grunus Bdv. eryphon Bdv. Lycæna acmon D.-H. battoides Behr saepiolus Bdv. rustica Edw. Eudamus tityrus Fabr. Nisoniades propertius Linn.

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Leaf Hoppers.

The study of these important and abundant insects has been quite neglected in this State. The insects are found everywhere, but especially on grasses and low herbaceous plants. Only one species, the grape thrips has been injurious enough with us to obtain recognition from people generally though the amount of injury done to lawns, meadows, and grain fields by quite a number of species is such as to deserve a great deal of attention

The object of this note is to direct the attention of the readers of the Post Card to the need of a careful field study of the life histories of these insects.

We know in a general way that the eggs are laid in the tissues of the plant, that the young live and feed in company with the adults on the under sides of the leaves and undergo their transformations there.

The exact place, time, and method of oviposition of the various species is a problem con.

Front wings with eleven veins
Hind wings with eight veins
Labial palpi erect or ascending
Veins four and five of front wings stemmed
Second vein of hind wings distant from the angle.....
..... **Myelois.**
Second vein of hind wings near the angle.....
..... **Dasypyga.**
Veins four and five of front wings short stemmed or separate
Second vein of hind wings distant from the angle
Veins four and five of hind wings very short stemmed
..... **Mineola.**
Veins four and five of hind wings stemmed
Maxillary palpi distinct, filiform..... **Dioryctria.**
Maxillary palpi small..... **Ambesa.**
Second vein of hind wings near the angle
Veins four and five of front wings very short stemmed or separate..... **Nephopteryx.**
Veins four and five of hind wings stemmed **Salebria.**
Labial palpi porrect or drooping
Veins four and five of fore wings stemmed
Maxillary palpi distinct..... **Selagia.**
Maxillary palpi invisible..... **Anoristia,**
Veins four and five separate or very short stemmed
Second vein of hind wings distant from the angle
Third vein of hind wings stemmed with the fourth con.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 68. Berkeley California Mar. 22. 1885.

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BLAISDELL F. E.
92.
Notes on some Californian Cistelidæ.
Zoe. Vol. III, pp. 252-253.
Stenochidus gracilis Lec. cyanescens Lec. Hymenorus inquilinus Casey fusculus Casey macer Casey Iromira variabilis Horn Cistela thevenetii Horn

Leaf Hoppers. con. upon the solution of which may hang our ability to successfully combat the insects.

The hibernation should also be carefully looked into for this may be the crisis period in the life of the insects determining to a great extent their relative abundance the ensuing season.

—o—

Important Notice,

Such a large number have expressed the wish to receive the Post Card weekly instead of daily we have desided to mail in bunches **once a week** unless otherwise directed. This new arrangement to begin with April. The Post Card will continue to be published daily and will be obtainable at the Entomological Laboratory each morning or will be mailed daily if desired.

—o—

Tomorrow being Charter day of the University, no issue of the Post Card will be made.

—o—

The Entomological society met this afternoon and had a very interesting session. Full reports will be given in our next.

and fifth
Third joint of the labial palpi deflexed.....**Pyla.**
Third joint of the labial palpi reflexed.....
.....**Lipographis.**
Third vein of hind wings separated from the fourth and fifth.....**Etiella.**
Second vein of hind wings near the angle
Tongue long and srtong
Third joint of the labial palpi nearly as long as the second.....**Epischnia.**
Third joint of the labial palpi one third as long as the second.....**Megasis.**
Tongue very small
Hind wings with seven veins
Second vein of hind wings distant from the angle
Veins four and five of front wings stemmed
Third joint of the labial palpi one half the length of the second
Labial palpi porrect .....**Zophodia.**
Labial palpi ascending.....**Euzophera.**
Third joint of the labial palpi one sixth the length of the second.....**Cayuga.**
Veins four and five of front wings separate.....**Martia.**
Second vein of hind wings near the angle
Antenna quite heavily bipectinate.....**Melitara.**
Antenna not bipectinate
Tongue strong

con.

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DAILY POST CARD.

A Californian Journal of Entomology.

No. 69. Berkeley California. Mar. 25. 1895

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University of California Entomological Society.

At the meeting of the society held last Friday, Mr. R. E. Gibbs was elected to membership.

The Secretary read a communication from Prof. J M. Aldrich regarding the article in the Post Card of Feb. 23. in reference to the food of lady birds He called attention to the work of Prof Forbes in Illinois on this subject. The report of this work is presented in Bulletins 3 and 6 of the Illinois State Laboratory of Natural History. It appears from these investigations that nearly half of the food of the lady birds consisted of fungi, and pollen constituted a good percent of it The discussion developed the fact that these insects in California must be also largely herbivorous.

Miss Tyrrell exhibited specimens of the Lecanium doing injury in western New York. It is quite indistinguishable from our common and variable scale known as the red apricot scale In reference to the name she con.

HOWARD L. O. 91.
The Biology of the Hymenopterous insects of the Family Chalcididae.
Proc U. S. Nat. Mus. Vol. XIV. pp. 567-588.
Dilophogaster californida Howard Lecanium oleae

Phycitidæ (3.) Lepidoptera.
Labial palpi ascending..... Staudingeria.
Labial palpi porrect
Tibial spurs long..... Dolichorrhina.
Tibial spurs short..... Honora.
Tongue weak
Third joint of the labial palpi one half the length of the second..... Lætilia.
Third joint of the labial palpi very short...Maricopa.
Front wings with ten veins
Labial palpi erect or ascending
Second vein of hind wings distant from the angle
Hind wings with seven veins..... Homœsoma.
Hind wings with six veins..... Manhatta.
Second vein of hind wings at the angle.....Ephestiodes
Palpi porrect or drooping
Hind wings with seven veins
Clypeus with a long tubercle..... Petaluma.
Clypeus without a tubercule..... Saluria.
Hind wings with six veins..... Cœnochroa.
Front wings with nine veins..... Eurythnia.

This family is one of those produced by the dismemberment of the family Pyralidæ A considerable number of this family live on other substances than the foliage of plants. Most of the dried fruit moths belong here as do the bee moths and those extremely interesting and important scale insect eaters. The life histories of none of our species has been worked out as yet. There are doubtless a great many species in this State not yet recorded in the books.

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DAILY POST CARD.

A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 70. Berkeley California Mar. 26. 1885.

BLAKE, C. A.
86.
Monograph of the Mutillidæ of North America.
Trans. Amer Ent. Soc. Vol. XIII. pp. 179-286.

Mutilla eximia Blake* A. peculiaris Cress. rutilans Blake Sphærophthalmia edwardsii Cress. parmosa Blake* venifica Blake* sackenii Cress. thetis Blake* A. magna Cress. L. aureola Cress. tecta Cress, erudita Cress, sicheliana Sauss. A. pacifica Cress ursula Cress, O. auraria Blake N. arota Cress. californica Radorz. phædra Blake N. aspasia Blake N. zenobia Blake coccineohirta Blake occidentalis Linn. ochracea Blake N. ulkei Cress. L. ferrugata Fab. connectens Cress. præclara con.

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con.

stated that the Lecanium pruinosum Coq. and L. armeniacum Craw were undoubtedly synonyms and both names would likely have to give way to some older eastern or European name. In reference to the frosty appearance of the typical L. pruinosum she explained that it was an abnormal waxy secretion which is found on other species of Lecanium as well especially our common black scale L. oleae.

Mr. Holmes reported the discovery recently in San Bernardino County by his sister of a mite which feeds upon the eggs of the black scale. The mite was studied under the act of devouring the eggs.

Mr. Woodworth called attention to the great abundance of a species of Psycoda on pine trees near Temescal. The trees were badly infested with the pine scale and as the male scales were very numerous the fly was supposed to be the male. Is there any relation between the scale and the fly?

Eyes ovate

Ocelli wanting in the female, abdomen ovate in both sexes . . . . . **Mutilla.**

Ocelli present in both sexes, abdomen linear in the male . . . . . **Methoca.**

Eyes round

Densely pubescent . . . . . **Sphærophthalma.**

Thinly clothed with hair

Body shining . . . . . **Photopsis.**

Body densely punctured

Abdomen petiolate . . . . . **Cyphotes.**

Abdomen not petiolate . . . . . **Myrmosa.**

These are often mistaken for ants but can be distinguished by the absence of the humps on the pedicel of the abdomen always present in the true ant. But little is known of the life history of these insects but as far as known they are parasitic as larvae.

Canagre Borer.

Growers of canagre in southern California have comlained of the presence of insects boring in the roots. The roots of this plant contains as high as twenty percent of tannin so an insect attack is quite a surprising matter. A short time ago specimens of affected roots were received at the University and it is certainly insect work. A fragment of a cast skin found in one of the burrows seems to be from a Tenebrionid.

—o—

Any one to whom a copy of this paper is sent is invited to become a member of the U. C. Ent. Society. Dues $2.50 per annum including subscription to the Post Card. C. W. Woodworth Sec.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 71. Berkeley California. Mar. 27. 1895.

Blake, C. A. 86.

Monograph of the Mutillidæ etc.

Blake* A. pygmea Blake N. Photopsis mendica Blake N. nokomis Blake A. unicolor Cress mellipes Blake A. trianguaris Blake N. ferruginer Blake N. melaniceps A. contracta Blake N. alcanor Blake A. atrata Blake N. albipes Cress. N. venustus Blake rustica Blake inconspicuus Blake* castanea Cress. L. nebulosus Blake* Chyphotes Blake* Myrmosa ruffiventris Blake Methoca californica Westw.

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The Orders of Insects

Many systems of classification for insects have been proposed by different authors and it may be useful to compare the systems the student will most frequently meet.

The adaptation of Brauer's system by Hyatt and Arms may serve as a starting point. Sixteen orders are recognized as follows:

1. Thysanura.
2. Ephemeroptera.
3. Odonata.
4. Plecoptera.
5. Platyptera.
6. Dermaptera.
7. Orthoptera.
8. Thrysanoptera.
9. Hemiptera.
10. Coleoptera.
11. Neuroptera.
12. Mecoptera.
13. Trichoptera.
14. Lepidoptera.
15. Hymenoptera.
16. Diptera.

They do not attempt dichotomous grouping. The relationships may be indicated as folows:

10 9 8 7 6 5 1
16 15 14 13 12 11 2 3 4

Lateral margin of the last ventral segment serrulate
Disk of thorax even, without foveæ or callosities
Elytral costæ very distinctly elevated
Clypeus broadly emarginate..... **octocola**, Lec
Clypeus semi-circularly emarginate **edwardsii**, Horn A.
First elytral costæ feebly indicated, others wanting.....
..... **debilis**, Lec.
Elytra with no trace of costæ..... **axillaris**, Horn A.
Disk of thorax irregular, median line more or less sulcate, often with callosities
Clypeus acutely notched at middle.. ...**femorata**. Fab.
Clypeus rather broadly notched
Prosternum without trace of lobe infront
Disk of thorax feebly or not sulcate
Color bright coppery bronze...**spiculifera**, Horn A.
Color black with bronzy lustre... ...**dolata**, Horn
Color cobalt blue changing to green .....
.....**viridicyanea**, Horn
Disk of thorax distinctly sulcate
Joints four to eleven of antennae more or less testaceous ....**dentipes.** Germ.
Antennae uniform
Antennae becoming slender towards the tip
Last ventral segment emarginate in both sexes, and in the males with a vague longitudinal impression..... **caurina**, Horn N. A.
Last ventral segment not emarginate in the female,

con.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 72 Berkeley California. Mar. 28. 1895.

HORN, G. H.

86.

A monograph of the species of Chrysobothris inhabiting the United States.

Trans. Amer. Ent. Soc. Vol. XIII. pp. 65-124.

Chrysobothris octocola Lec. edwardsii A. Horn* debilis Lec. axillaris Horn* A. femorata Fab. contigua Lec. speculifera Horn* A. viridicyanea Horn* dolata Horn* dentipes Germ. indificata Horn* carinipennis Lec. N. taurina Horn† O. N. californica Lec. quadrilineata Lec. A. exesa Lec. A. nixa Horn† delecta Lec. deserta Horn† lixa Horn† A. cyanella Horn† humilis Horn† A. arcta Chev. A. gemmata Lec. A. con.

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The Orders of Insects.

The classification in Nicholson's Zoology is widely used. It is as follows:

9pt.	Anoplura.
5pt	Mallophaga
1.	Thysanura.
8 & 9pt.	Hemiptera
7	Orthoptera.
2 3 4 5 6pt. 11 12 & 13	Neuroptera
16pt.	Aphaniptera.
16pt.	Diptera.
14	Lepidoptera.
15	Hymenoptera.
10pt.	Strepsiptera.
10pt	Coleoptera.

The numbers above are those of the Hyatt and Arms classification. The orders divided are [5.] Platyptera by the removal of the bird lice, [9,] Hemiptera. by removing the true lice, [10.] Coleoptera by removing the Stylopidæ and (16.) Diptera by separating the fleas.

The grouping adopted by this author consists in dividing the orders into three series, Ametabola comprising the first three orders, Hemimetabola the next three, and Holometabola the remaining six. This classification is common in England

nor impressed in the male.....
....**carinipennis**, Lec. N.

Antennae not slenderer towards the tip.... .....
....**ludificata**, Horn.

Prosternum lobed in front, sometimes rather feebly

Median sulcus of prothorax very well marked

Elytral costæ not expanding near the base..... .....
.....**californica**, Lec.

Elytral costæ expanding near the base in broad smooth spaces more or less confluent

Fourth costa scarcely at all indicated.....
....**quadrilineata**, Lec. A.

Fourth costa finely elevated..... **exese**, Lec. A.

Median sulcus very feeble linear or almost obliterated

Front femur distinctly toothed

Last ventral segments with a distinct, submarginal, feebly serrate ridge ... .**texana**. Lec.

Last ventral segments without a submarginal ridge

Tooth of front femur not serrulate **contigua**, Lec.

Tooth of front femur with very few serrulations..
.....**cyanella**, Horn

Tooth of front femur distinctly serrulate

Elytral costæ indistinct or replaced by smooth lines

Thorax with an oblique callosity on each side
....**mali**. Horn

Thorax with four callosities in a transverse con-

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 73. Berkeley California. Mar. 29. 1895.

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HORN, G. H. 86.

A monograph of the species etc.

merkelii Horn* A. acutipennis Chev. A. libonoti Horn* A. chalcophoroides Horn* A. aeneola Lec. N. A. atrifrsciata Lec. A. prasina Horn*

The Orders of Insects.

The classification most used by German authors is that adopted by Balfour in his comparative Embryology.

1. Aptera.
2.-7. Orthoptera.
8.-9. Hemiptera.
16. Diptera
11.-13. Neuroptera.
10. Coleoptera.
14. Lepidopte,a,
15. Hymenoptera.

The numbers have the same significance as before. There are no groupings of orders

In LeConte and Horn's Classification of Coleoptera the following system appears:

15. Hymenoptera.
16* Diptera.
14. Lepidoptera.
10. Coleoptera.
9.† Hemiptera-
8.-9.† Homoptera.
6.-7. Orthoptera.
2, 3. 4, 5. 6.‡ 11. 12. & 13, Neuroptera.
16* & 6.‡ Anoplura.
1. Thysanura.

The first three orders form a group allied to which is the fourth. The other orders are grouped in pairs.

row..... **deserta,** Horn
At least the first elytral costa distinct
Thorax with distinct callosities. **delecta,** Lec.
Thorax without callosities
Front tibiæ arcuate in both sexes, suddenly enlarged at tip in the male..... **nixa,** Lec.
Front tibiæ nearly straight in the female and only slightly enlarged at tip in the male..... **lixa,** Horn A.
Front femora without a tooth..... **humilis.** Horn A.
Lateral margin of last ventral segment serrulate
Elytra acuminate at tip
Thorax scarcely or not at all sulcate at middle
Lateral margin of last ventral segment abruptly interrupted..... **ærea,** Chev. A.
Lateral margin of last ventral segment entire
Thorax with three golden foveæ.... **gemmata,** Lec A.
Thorax with two indistinct foveæ.. **merkelii,** Horn A.
Thorax with two coppery foveae **acutipennis,** Chev. A.
Thorax distinctly sulcate..... **libonoti,** Horn A.
Elytra obtuse and serrulate at tip
Elytra either costae or discal foveae or both
Last ventral segment with a submarginal, elevated, serrulate sidge..... **chalcophoroides,** Horn A.
Last ventral segment without submarginal ridge..... **æneola,** Lec. N. A.
Elytra without costae or foveae

con.

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A Californian Journal of Entomology.

No. 74. Berkeley California. Mar. 30. 1895.

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Horn, G. H. 68.
Dinapate wrightii and its larva.
Trans. Amer. Ent. Soc. Vol. XIII. pp. 1-4.
Dinapate wrightii Horn*

The Orders of Insects.

Among the more German systems is in the Text Book of Comparative Anatomy by Arnold Lang which has recently been translated into English.

1.* Thysanura.
1.* Collembola.
6. Dermaptera.
7. Orthoptera.
2. Ephemeridae.
3. Odonata.
4. Plecoptera.
5 Corrudentia.
8 Thysanoptera.
9. Rhynchota.
11. Neuroptera.
12 Panorpata.
13. Trichoptera.
16.† Siphonaptera.
10. Coleoptera.
14. Lepidoptera.
15. Hymenoptera.
16.† Diptera.

The differences between this and the classification of Hyatt and Arms consists in the separation of the Collembola and Siphonaptera as distinct Orders, the rearrangement, and the use of different names in a few cases. The only grouping of the Orders is into Pterygota and Apterygota.

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DAILY POST CARD.

A Californian Journal of Entomology.

No. 75. Berkeley California. Apr. 1. 1895.

HORN, G. H.

86.

A monograph of the species of the sub-families Eucneminæ, Cerophytinæ Perothorinæ inhabiting the United States.

Trans. Amer. Ent. Soc. Vol. XIII. pp. 5-58.

Melasis rufipennis Horn* N. Eucnemis americana Horn* Dromaeolus californicus Bonv. nitens Horn* O. basalis Lec. N. Microrhagus humeralis Say Xylobius cylindriformis Horn. Cryptostoma dohrni Horn Cerophytum convexicolle Lec. Perothops wittickí Lec.

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The Orders of Insects

No Entomologist is wider known in this country than Prof A, S Packard and his views on classification are very widely adopted,

In his Guide to the Study of Insects we find his earlier ideas.

15. Hymenoptera.
14. Lepidoptera.
16. Diptera
10. Coleoptera.
5† 8 9 Hemiptera.
6. 7. Orthoptera.
2 3. 4† 5 11. 12. 13. Neuroptera.
1. Thysanura.

A second system proposed by him is the one adopted in the Standard Natural History, and differs from the above in separating the (6.) Dermaptera from the Orthoptera and the limiting of the Neuroptera to the higher [11. 12. 13.] forms and grouping the others as Pseudoneuroptera. As for grouping the Orders he considers Thysanura, Hemiptera and Coleoptera isolated groups. The three higher Orders form a fourth group and the remaining four a fifth group.

Middle tibiæ only spinulated
Ordinary lines indistinct.....**chelidonia**, Grt. A.
Ordinary lines distinct.....**verrilliana**, Grt
Middle and hind tibiæ spinulated
Hind tibiæ spined between the two pairs of spurs only
Hind wings yellow or orange red.....**ilia**, Cram.
Hind wings red
Third joint of palpus at least half the length of the second
Front wings pale
A black shade beginning at the costa, concealing the reniform and ending near the apex.....**marmorata**, Edw.
Reniform not concealed, russety....**stretchii**, Behr.
Front wings dark
Ordinary lines indistinct.....**mariana**, HEdw.
Ordinary lines distinct.....**electilis**, Walk.
Third joint of palpus less than half the length of the second joint
The red of the hind wings not covering half the surface.....**amatrix**, Hub.
The red of the hind wings covering atleast half the surface
Front wings gray or creamy brown **junctura**, Walk.
Front wings dark maroon brown **babeyaga**, Steck. A.
Hind tibiae spined between and above the two pair of spurs
Hind wings yellow
Front wings greenish drab.....**andromache**, HEdw. con.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 76. Berkeley California, Apr. 2. 1885.

HULST, G. D. 86.

Descriptions of new Pyralidæ.

Trans. Amer Ent. Soc. Vol. XIII. pp. 145-169.

Parædis napæalis Hulst* Agrossa electalis Hulst* A. Emprepes magnalis Hulst* A. Scoparia ninguidalis Hulst* A refugalis Hulst‡ Chalcœla gemmalis Hulst‡ Botis roseopennalis Hulst‡ A. offumalis Hulst‡ luualis Hulst‡ nexalis Hulst‡ O. labeculalis Hulst‡ A. levalis Hulst‡ octosignalis Hulst‡ festalis Hulst‡ A. uxorculalis Hulst‡ obnigralis Hulst‡ thrallophilalis Hulst‡ monulalis Hulst‡ fumoferalis Hulst§ oblectalis Hulst§ A. scurralis Hulst§ A. Eurycreon aureolalis Hulst§

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The Orders of Insects.

Prof. Packard's latest views upon the classification of insects is presented in his Entomology for Beginners.

1. Thysanoptera.
6 Dermapter.
7. Orthoptera.
5. Platyptera.
3. Odonata.
4. 2. Plectoptera.
8. Thysanoptera.
9. Hemiptera.
11. Neuroptera.
12. Mecoptera.
13. Trichoptera.
10. Coleoptera.
16.* Siphonaptera.
16.* Diptera.
14. Lepidoptera.
15 Hymenoptera.

The grouping of the Orders according to this author is into two primary divisions of eight Orders each. These have each three lesser groups as follows:

Ametabola

Group 1. Order 1,
" 2. " 2,-7.
" 3. " 9.-9.

Metabola

Group 4. Order 11.-13.
" 5. " 10.
" 6 " 14.-16.

Front wings brown with sometimes a greenish tint.....
.....**deliah**, Streck. A.
Hind wings red.....**aholibah**, Streck.
Hind wings black and white
Ordinary lines distinct.....**relicta**, Walk O.
Only the transverse posterior line distinct.....
.....**elda**. Behrens O.
All tibiae spinulated.....**piatrix**, Grt. A

The Catocala are moths of large size and of somber colors as they stand at rest on the trunk of a tree during the day. The hind wings which are ordinarily concealed are strikingly different as indicated in the above synopsis. The larvæ feed at night upon the leaves of plants and are hidden close by during the day often on the bark of the trunk being, like the moths so colored as to be quite indistinguishable from the bark.

Wire Worms.

Wire worms seem to be quite abundant this spring. The name is sufficiently suggestive of their appearance to insure their recognition. They are the young of the insects known as snapping beetles or skip jacks. A good number of species are known in this State but it is not known to what species the worms that are so injurious to cultivated crops belongs. No really satisfactory remedy for these insects is known. For garden plots the use of poisoned bait both for the worm and the adult beetle may prove valuable. It would be well for those favorably situated to attempt to determine this point. A simple method of rearing such insects is to place a small handfull of corn in a flower pot half full of earth and containing one or more wireworms. Place a saucer over the pot making all tight with sealing wax, and bury.

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THE ENTOMOLOGIST'S

DAILY POST CARD.

A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 77. Berkeley California. Apr. 3. 1895.

HULST, G. D.

86.

Descriptions of new Pyralidæ.

A. Orobena reluctalis Hulst* A. subcitrinalis Hulst* A. seminivealis Hulst* A. Nephopteryx delassalis Hulst* N. perfuscalis Hulst† lallatalis Hulst† N. Pinipestis fasciolalis Hulst† N. Homeosoma impressalis Hulst† N. Megaphycis fernaldialis Hulst† A. edwardsialis Hulst‡ N. Anerastia exantalis Hulst‡ dotalis Hulst‡ A. Ephestia alboostialis Hulst‡ Crambus delectalis Hulst‡ A. biothanatalis Hulst‡ guasapalis Hulst‡ Schoenobius opalescalis Hulst‡ A.

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Insect Lime.

A remedy for insects considerably used in Europe and scarcely known at all in this country is insect lime. Recently it has been put on the American market by a German manufacturer.

Insect lime is used in the same manner and for the same classes of insects as tar is used in this country. It is more expensive than tar but has the advantage of not drying any where near as quickly and this fact will generally offset the difference in price.

While insect lime is a most excellent remedy it is at the same time of very limited applicability.

The conditions under which it is useful are those in which the insect migrates to the plant on foot and where it is practical to interpose a band of the lime. In those cases where this does occur nothing could work more satisfactorily. There is no insect of any great importance in this State that could be treated in this way. Doubtless among the minor injurious kinds this remedy will be profitable.

Tarsi less than one half the length of the tibiæ
Prosternum trisinuate in front
Thorax wider than the base of the elytra
Thoracic margin wide, distinctly reflexed
Thorax much wider at base than the base of the elytra
..... **amphicollis,** Lec. A.
Thorax but little wider at base than the base of the elytra
Prosternum coarsely and rather densely punctured...
..... **opacula,** Lec. A.
Prosternum very finely and sparsely punctured.....
..... **amabilis,** Horn A.
Thoracic margin very narrow, not reflexed **robusta,** Horn
Thorax not wider than the base of the elytra
Thorax unicolored
Abdomen more densely punctured at the sides than at the middle..... **pubiventris,** Horn
Abdomen equally and sparsely punctured.....
..... **plagiaticauda,** Horn
Thorax margined with yellow ..... **hepburnii,** Lec
Prosternum unisinuate in front
Thorax unicolored or with only a small spot on the sides
Lateral margin of thorax scarcely visible from above
Elytra spotted all over..... **acuta,** Lec.
Elytra with only three spots behind the middle.....
..... **dohrni,** Horn
Lateral margins of thorax visible their whole length from
con,

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No. 78. Berkeley California. Apr. 4. 1895.

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University of California Entomological Society.

There will be a meeting of the Society in the Entomological Laboratory Friday March 22nd. at 4.40 P M. Each member will be expected to present an observation Any one interested is invited to attend.

—o—

A San Jose scale law has been prepared for New York which if it becomes a law will enable the State Entomologist or rather the Commissioner of Agriculture to exterminate the insect at any cost. The Commissioner may appoint any number of inspectors paid from the various county treasuries the counties having the right to recover by legal action from the property involved the sums so spent Such a law ought to be effectual if any could be.

—o—

The synopsis completed in todays issue is of a group of beetles very well represented in this State. The life history of none of our species is known. Like all common and little known insects they should be looked upon with suspicion.

OSTEN SACKEN, C. R. 95.
Western Pedicia, Bittacomorphæ and Trichoceræ.
Psyche, Vol. VII, pp. 229-231.
Pedicia obtusa OS. Bittacomorpha occidentalis Aldr. Trichocera trichoptera OS.

above

Apical margin of last ventral segment single..... **connexa**, Lec

Apical margin of last ventral segment double..... **flavosticta**, Horn

Thorax broadly margined with yellow..**decipiens**, Lec. A.

Prosternum truncate in front

Fourth joint of antenna cylindrical, fifth suddenly broader

Apical margin of the last ventral segment double

Thorax margined with yellow at the sides..... **pulchella**, Herbst.

Thorax without yellow margins

Apex of thorax narrower than the base..... **subbalteata**, Lec. L,

Apex of thorax not narrower than the base..... **versuta**, Horn

Apical margin of last ventral segment single

Last three segments of abdomen more densely and finely punctured than the preceeding....**guttifera**, Lec

All the abdominal segments equally and sparcely punctured

Sides of thorax arcuate.....**quadrivittata**, Horn

Sides of thorax straight..... **mariposa**, Horn

Antennæ enlarging gradually from the third joint..... **gemina**, Horn

Prosternum lobate in front..... **gibbula**, Lec. A.

Tarsi more than half the length of the tibiæ

Prosternum emarginate in front..... **combta**, Lec.

Prosternum truncate in front..... **alacris**, Horn

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A Californian Journal of Entomology.

70. Berkeley California, Apr. 5. 1885.

Williston S. W. 86.

Dipterological notes and descriptions.

Trans. Amer. Ent. Soc. Vol. XIII, pp. 287-3ff7.

Symphoromyia pachyceras Willis.* plagens Willis* O. Myelaphus lociormis OS Stichopogon trifasciatus Say Leptomidas pantherinus Gerst. Midas luteipennis Loew? A. militaris Gerst. A. scitulus Willis * Isopogon limbatus Willis.* A. Thereva crassicornis Willis † Cistogaster diversa Loew Dejeanii corpulenta Wied. A rufiloides Jaen. hystricosa Willis.† Hystricia sotor Willis.† A. Surinia algens Wied O. hystricoides con.

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Plant Lice.

These insects appear to be unusually abundant this season. Last year they were abundant but not as early as this Attention has already been called to the abundance last fall and this spring of the various lady birds. Lady birds are still very abundant but the interesting fact is that it is the exception to find a lady bird any where near a colony of plant lice

Other enemies howeve are at hand and at work. Certain Chalcid flies are the most important of these. One was observed the other day in the act of oviposition The colony of plant lice were attended by ants and some what defended by a clump of small leaves. The parasite was a very active little creature apparently affraid of the ants. The jerky vibrating motion of the plant lice likewise would cause an immediate retreat. After considerable preliminary skirmishing it would approach a plant louse it would suddenly bring the abdomen down between the legs reaching forward and depositing the egg on the back of the louse.

Antennæ three jointed
Marginal cell appendiculate ..... Hylotoma.
Marginal cell not appendiculate
Antennae simple ..... Atomacera.
Antennae furcate in the male ..... Schizocerens.
Antennae six jointed ..... Xyela.
Antennae seven jointed ..... Cimbex.
Antennae eight jointed
Three submarginal cells ..... Trichiosoma.
Four submarginal cells ..... Labidia.
Antennae nine to thirteen jointed
One marginal cell
Three submarginal cells
Marginal cell not appendiculate ..... Schizocerens
Marginal cell appendiculate ..... Hylotoma.
Four submarginal cells ..... Nematus.
Two marginal cells
Three submarginal cells
First and second submarginal cells each receiving a recurrent vein
Hind wings without middle cell ..... Emphytus.
Hind wings with one middle cell ..... Harpiphorus,
Second submarginal cell receiving both recurrent veins ..... Dolerus.
Four submarginal cells
Second recurrent vein received at the intersection of the second and third submarginal cells ..... Mesoneura.

con

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No. 80. Berkeley California. Apr. 6. 1895.

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A Home made Microtome.

The fact is not generally appreciated that simple instruments may be constructed by any one capable of doing a very high grade of work The microtome described below is designed for cutting serial sections of objects imbedded in paraffine.

The material used consists of 5 ft 1¼ in. window strips, preferably of hard wood, 5 1 in. round headed screws, 1 pc. of sheet brass 3 by 4 in. about 1-16 in thick, a razor, a flat headed nail, a screw driver, a disk of cardboard 3 or 4 in. in diameter, and a piece of string.

To construct the microtome cut the stick into two pieces 2½ ft. long. Fasten one of these to the edge of the table by means of two screws at one end leaving the other end free. About a half an inch before this free end a nail is driven into the table leaving nothing projecting. A screw is inscerted in the strip just over the nail head so the point of the screw will bear against it- By turning this screw the end of the strip is con.

WILLISTON S. W.

86.

Dipterological notes and descriptions.

Willis.† Echinomyia iterans Walk. filipalpis Thom. Belvoisia bicincta Desv. A. Saundersea signifera Walk. bicolor Willis.† Melanophrys flavipennis Willis.† Hypoderma lineata Villers Oedthera mantis Deg.

Tenthredinidæ. (2.) **Hymenoptera.**

Second recurrent vein received by the second submarginal cell

Abdomen short, egg-shaped

Lanceolate cell petiolate

Hind wings without middle cell... **Blennocampa.**

Hind wings with one middle cell

Third joint of antennae longer than the fourth... **Monophadnus.**

Third joint of antenna shorter than the fourth... **Phymatocera.**

Lanceolate cell constricted in the middle... **Hoplocampa.**

Lanceolate cell with oblique cross vein

Hind wings without middle cell... **Caliroa.**

Hind wings with one middle cell... **Monostegia.**

Hind wings with two middle cells... **Eriocampa.**

Lanceolate cell open at the shoulder, witaout cross vein... **Selandria.**

Abdomen lengthened, cylindrical

Hind femora reaching the tip of the abdomen

Antennæ reaching about to the base of the abdomen

Lanceolate cell with oblique cross vein... **Siobla.**

Lanceolate cell with short straight cross vein or subcontracted in the middle... **Macrophya.**

Antennæ reaching beyond the base of the abdomen... **Pachyprotasis.**

con.

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No. 81. Berkeley California, Apr. 8. 1885.

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A Home made Microtome.

con.

made to receed from or approach the table. This screw is made to carry the card board disk when thin sections are to be cut. The disk is graduated for greater accuracy. The sheet of brass is bent so as to reach around this strip and clasp the back of the razor. The other strip is screwed to the top of the table at right angles to the other strip and about an eighth of an inch from it. The free end is the one nearest the other strip. To this end the object is cemented. It is made to play up and down across the edge of the knife by means of a string attached near this end.

The angle at which the knife is held depends primarily on the angle at which the brass sheet is bent but it can be modified by the use of small wooden wedges. The paraffine block containing the object is fastened by means of heat to the end of the object strip. A section is cut by raising the end of the object strip with the string and after turning the screw that

con.

HOWARD, L. O. 95.
Further notes on the San Jose scale.
Insect Life. Vol. VII. pp. 283-295.
Aspidiotus perniciosus Aphelinus mytilaspidis Le B., Aspidiotiphagus citrina
Craw Aphelinus fuscipennis.

Hind femora not reaching the tip of the abdomen
Antennæ short and more or less thickened towards the tip..... **Gllantus.**
Antennæ long and bristle like
Lanceolate cell open
Hind wings without a middle cell.. **Taxonus.**
Hind wings with two middle cells..... **Strongylogaster.***
Lanceolate cell with oblique cross vein..... **Strongylogaster.***
Lanceolate cell with straight crossvein
Third joint of antennæ much longer than the fourth..... **Tenthredo.**
Third and fourth joints of antennæ subequal.. **Tenthredopsis.**
Three marginal cells..... **Xylaa.**
Antennæ many jointed
One marginal cell..... **Lophyrus.**
Two marginal cells..... **Pamphilius.**

These insects are commonly known as saw flies because of the saw like structure of the ovipositor by which they are enabled to insert their eggs within the tissue of the leaf or stem of the plant. The eggs at least of some are flattened when laid and become plump by absorbing water from the plant. The larvæ generally have a close resemblance to caterpillars but may be distinguished by the presence of more than sixteen legs. The common pear slugs belong to this family. Pupation is generally in the ground

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N . 82. Berkeley California, Apr. 9. 1885.

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A Home made Microtome.

con

governs the movement of the knife strip the string is released

With such an instrument if sufficient care and skill is exercised very good result may be obtained. Sections can not be cut as rapidly as on some of the automatic machines but that is really a mataer of minor importance.

In the next issue we will begin an article on section cutting.

—o—

University of California Entomological Society.

There will be a meeting of the Society in the Entomological Laboratory Friday April 19th at 4.40 P.M. Each member will be expected to present an observation. Any one interested is invited to attend.

The above notice appeared in the issue of April 4th. with the wrong date. Let us have a full attendance.

—o—

We hope before long to be able to publisn a generic synopsis of our Noctuidæ.

PURGANDE, T. 95.
The cotaon or melon plant-louse.
Insect Life. Vol. VII. pp. 309-315.
Aphis gossypii Glover

Thorax globose

Elytra transversely impressed behind the middle..... **bifasciatus**, Lec. A.

Elytra not transversely impressed

Sides of horn feebly serrate at least behind

Crest of horn suddenly and rather strongly elevated.. **apicalis**, Lec.

Crest of horn scarcely elevated..... **denudatus**, Horn

Sides of horn not serrate..... **conformis**, Lec.

Thorax transversely oval

Sides of horn scarcely or not at all serrate

Head finely punctulate..... **nuperus**, Horn A

Head sparsely punctulate..... **cavicornis**, Lec

Sides of horn distinctly serrate

Band on the elytra at the middle..... **calcaratus**, Horn N A F.

Band on the elytra behind the middle

Body finely pubescent beneath..... **monodon**, Fab.

Body sparsely pubescent beneath..... **serratus**, Lec.

These insects are small beetles about ⅛in. long and at once distinguished by the posession of a long horn-like projecting from the prothorax over the head. They have done considerable injury in this State by eating into ripe or nearly ripe apples. Nothing is known of their life history. The injurious species is supposed to be N. monodon but it will doubtless be found that other species have a share in it. We would be glad to know of cases of injury by other species.

—o—

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No. 83. Berkeley California. Apr. 10. 1895.

CRITTENDEN, T. H. 95.

On the distribution of certain imported beetles.

Insect Life. Vol. VII. pp. 326-332.

Lyctus unipunctatus Illst. Tribolium confusum Duv. ferrugineum Fab. Echocerus cornutus Fab. maxillosus Fab. L.

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Serial Sectioning.

One of the most important methods used in anatomical investigation is serial sectioning. The detail of the method varies to some extent and we will only attempt to give an outline of the method as applied to the simplest class of insect tissue. It would be well to experiment continually in all the steps of the process after getting the method once well in hand but at first one should follow the directions accurately.

The process may be divided into four primary divisions, the preparation of the object, the imbedding in paraffine, the cutting of the sections, and the mounting of the sections for microscopical study.

1. Preparation.

For killing or fixing the tissue use heat as follows: Place about two cubic centimeters of water in a test tube and bring it to a boil. Drop the piece to be sectioned in the water at once and let it remain while the water cools to below sixty degrees Centigrade. If not too large the whole insect may be placed

con.

Thorax with a distinct and regular series of dorsal punctures
Anterior tarsi more or less dilated
Thorax with a dorsal series of three punctures
Thorax not narrowed in front
Elytra opaque.....**alutaceous**, Horn
Elytra shining
Head transverse.....**bucephalus**, Horn
Head oval
Elytra and abdomen sparsely punctured.....**niticens**, Horn
Elytra and abdomen rather densely punctured.....**furvus**, Nord.
Thorax narrowed in front
Elytra bright blue.....**gentilis**, Horn A.
Elytra reddish.....**semiruber**, Horn
Elytra piceus to testaceous.....**hepaticus**, Erichs
Thorax with a series of four dorsal punctures
Thorax distinctly narrowed in front
Elytra densely punctured
Coxæ and femora very pale..**gracilicornis**, Horn A.
Legs all black.....**varians**, Payk.
Elytra sparcely punctured
Antennæ with joints 4-10 wider than long.....**umbrinus**, Grav.
Antennæ with joints 4-10 longer than wide.....**longicornis**, Steph.
Thorax very little or not narrowed infront

con.

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o 84. Berkeley California, Apr. 11. 1885.

Serial Sectioning. con. in the water.

For hardening alcohol is used as follows: Place first in thirty five per cent alcohol for a half hour. If the whole insect was fixed it should be well punctured before placing in the alcohol so the latter will have free access to the soft parts. The object is transferred from the thirty five to fifty per cent alcohol. After remaining half an hour in this grade the object is put into seventy per cent alcohol in which it may remain indefinitely. To complete the hardening process the object is kept for atleast a day in alcohol above ninety five per cent.

2. Imbedding.

The first step in imbeding is to remove the alcohol. This is done by soaking the object a few minutes in oil of cloves. This makes the object more transparent and by watching carefully one can tell the moment the clearing is completed. Too long treatment with oil has a tendancy to make the object brittle.

From the oil the object is con.

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The gray hair-streak butterfly and its damage to beans.
Insecw Life, Vol. VII, pp. 354-355.
Uranotes melinus Hubn.

Antennæ with joints 4-10 distinctly longer than wide
Abdomen opaque ..... **pubes,** Horn N.
Abdomen shining ..... **puberulus,** Horn
Antennæ with joints 4-10 about as wide as long
Antennæ piceus
Abdomen with finer punctures below than above ... . **Theneneti,** Horn
Abdomen with coarser punctures below than above ..... **grsndicallis,** Horn
Antennæ testaceous ..... Grav. N. A.
Thorax with a dorsal series of five punctures
Antennæ with joints 4-10 distinctly longer than wide
Thorax obviously narrowed in front .... **pettiti,** Horn
Thorax only a very little narrowed in front
Abdomen densely and finely punctured
Front coxæ piceous ..... **triangulum.** Horn
Front coxæ testaceous ..... **caurinus,** Horn
Abdomen coarsely and sparsely punctured .... **crotchii,** Horn
Antennæ with the outer joints nearly square .... **ferreipennis,** Horn
Anterior tarsi not dilated
Thorax with a dorsal series of three punctures
Elytra conjointly nearly square .. .... **sordidus,** Grav.
Elytra conjointly longer than wide
Elytra bronzed ..... **filicornis,** Horn N. con.

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A Californian Journal of Entomology.

No. 85. Berkeley California, Apr. 12. 1885.

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Serial Sectioning. con. transferred to melted paraffine having a melting point of about fifty degrees centigrade. The object remains in this say half an hour depending on the size and degree of openness of the tissue. It then is placed in harder paraffine for about twice as long. The melting point of this paraffine should be about fifty five degrees centigrade.

During the whole imbedding process the temperature must not be allowed to rise above sixty degrees and the best plan is to keep the paraffine only just melted.

The next step is the removal of the hard parts of the insect from the tissue to be cut.

The block for cutting is now cast. A convenient mould is one consisting of a piece of glass and four type-metal quods arranged to form a box. The glass and quods are wetted with glycerine so the paraffine will not stick to them. These are all warmed if the object needs much manipulation, otherwise they are used cold. The block should be cooled as quickly as

con.

HOWARD, L. O.
The scale-insects of Arizona.
Insect Life Vol. VII. pp. 359-360.
Aspidiotis perniciosus, Lecanium pruinosum, olee, Tachardia larreae, Diaspis rosae, Lecanium phorodendri, Diaspis cacti
85.

Elytra brownish testaceous ..... **versutus,** Horn

Thorax with a dorsal series of four punctures

Thorax nearly square ..... **ventralis,** Grav. N.

Thorax longer than wide ..... **distans,** Horn N.

Thorax with a dorsal series of five punctures

Thorax nearly as wide as long

Color black ..... **siegwaldi,** Mann.

Color brown ..... **crassulus,** Horn N

Thorax notably longer than wide

Hind angles of head punctulate

Antennæ with the two basal joints pale .....

..... **bidentatus,** Horn

Antennæ all dark

Legs black or yelloyish brown ... **nigritulus,** Grav.

Legs reddish brown ..... **decipiens,** Horn

Hind angles of the head not punctulate

Antennæ with the two basal joints pale .....

..... **parvus,** Horn A.

Antennæ all dark

Last ventral segment sinuate on each side .....

..... **clunalis,** Horn

Last ventral segments not sinuate laterally .....

..... **punctatellus,** Horn

Thorax with six dorsal punctures arranged in a sigmoid series

Antennæ as long as the head and thorax

Thorax not narrowed in front ... **albinicus,** Mann. A. con.

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DAILY POST CARD.

A Californian Journal of Entomology.

No. 86. Berkeley California. Apr. 13. 1895.

The Library
of the
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HOWARD, L. O.
95.
New Food-plant for the San Jose Scale,
Insect Life Vol. VII, p. 360.
Aspidiotus perniciosus

Serial Sectioning. con. possible to prevent the formation of large crystals which might distort the tissue. For most small objects the type metal quods may be dispensed with and the imbedding simply labeled on to the cold glass

3. Cutting.

The block is cut into a rectangle with the object rather to one side of the middle It is next fastened to the section holder of the microtome using a hot scalpel or pocket knife blade for this purpose. Any further trimming of the block that may be needed is now done and the object is ready for cutting.

The knife should be arranged so that it will cut without any sliding motion The block should present the face having the object nearest the surface to the knife.

The temperature while cutting is a most important matter and when getting ready to cut provision should be made where by it may be varied at will. The temperature should be raised if the sections curl or if they do not stick together into a ribbon,

con.

Thorax narrowed in front ..... Horn L
Antennæ shorter than the head and thorax .....
..... **picicornis**, Horn N.
Thorax irregularly punctured, with no distinct dorsal series
Thorax longer than wide ..... **quadrulus**, Horn
Thorax as wide as long ..... **lecontei**, Horn

Philonthus politus Linn. L. and P. alumnus Erichs A. L. should have been included in the above table, the former differs from P. hepaticus in having a distinct brassy lustre and the latter from P. caurinus in having the thorax longer than wide. Instead of P. umbrinus Gray. read P. flavolimbatus Erichs. A. L. This genus includes some of our commonest short-winged beetles.

—o—

A New Manual of Entomology.

The most important work that has appeared for some time is "A Manual for the Study of Insects by John Henry Comstock and Anna Botsford Comstock" a book of above 700 pages and more than 800 illustrations. There is a smaller amount of introductory matter than in Prof. Comstock's former book and there is a similar reduction in all the matter treated there. About forty pages are devoted to a very satisfactory treatment of the arthropod relatives of insects. About a third of the book is occupied with Lepidoptera and is the best review of the group that has yet appeared. To be particularly commended also is the chapter on Diptera. We will review the work in more detail in later numbers of the Post Card.

con.

There will be no issue Monday, Arbor dry.

The Post Card is the only paper devoted to the insects of the pacific coast.

The bibliography covers all the current literature of this fauna.

The synopses form a key for identifying our species.

300 number "

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THE ENTOMOLOGIST'S

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No 87. Berkeley California, Apr. 16. 1885.

Serial Sectioning. con. and lowered if they wrinkle or if they crush together becoming much narrower than the block from which they are cut.

As the sections are cut they should be laid in rows flat upon a sheet of paper and the sequence indicated by pencil marks.

4. Mounting.

Square covers are best for mounting serial sections. They may be used alone or with slips. In the latter case a rectangle the size of the cover is marked on a piece of paper and the slip laid upon this. A thin layer of a fixative composed of one part of clove oil and two of collodion is applied with a brush to the part of the slip above the rectangle The ribbons are now broken into lengths and arranged on the slip, care being had to keep the sections always well within the rectangle so the cover glass will cover them.

If the sections are to be mounted between cover glasses, one of the covers is placed on a slip of blotting paper and treated as before.

After the sections are all ar-

con.

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ROTE, A. R. and C. T. ROBINSON 67-8.
Descriptions of North American Lepidoptera.
Trans Amer. Ent. Soc. Vol. I. pp. 1-29, 171-192, 323-360, Vol. II. 79-206.
Sesia thetis G-R* Alypia dipsaci G-R* sacramenti G-R* lorquini G-R* marripo-a R* Clemelia orthosceptus G-R* rubroscapsus G-R* Gnophaela hopfleri G-R* Epilallia virginalis Boisd. Arctia dahlmica Boisd Nemophila cespitis G-R* cichorii G-R* Phiprosera, linus plagiata G-R Bethyura ornata G-R*

Face entirely convex ..... Cleptes.
Face more or less concave
Last abdominal segment without grooves or pits
Tarsal claw with two to six distinct teeth
Last abdominal segment notched
Angles of notch produced ..... Notozus.
Angles of notch not produced ..... Nmalus.
Last abdominal segment not notched ..... Holopyga.
Tarsal claw with a single small tooth at the middle .....
..... Hedychridium.
Tarsal claw bifid ..... Heydichium.
Last abdominal segment with a submarginal row of pits often in a groove ..... Chrysis.
Last abdominal segment with a deep submarginal groove on each side but without pits ..... Parnopes.

The Chrysididæ are brilliantly colored wasps at once distinguished by the abdomen being hollowed out beneath so the insect can roll itself up into a ball. They lay their eggs in the nests of digger wasps.

—o—

The Honey Dew of the Pine.

The pine Lecanium is the greatest of our honey making insects. The honey secreted by it is thoroughly good. Flies swarm about infested trees. Ants to the numbers of tens of thousands are some times present on a single tree. Bees sometimes are so numerous as to sound like a swarm The insect is not always so attractive. Often of two adjacent trees in as far as one can see in identical condition one will attract insects and the other not.

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A Californian Journal of Entomology.

No. 88. Berkeley California. Apr. 17. 1885.

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Coquillett. D. W- 94.
Revision of the Dipterous Family Therevidæ,
Journal N. Y. Ent. Soc. Vol. II. pp. 97-101.
Nebritus pellucidus Coq.* Thereva egressus Coq.* melanura Loew.

Serial Sectioning. con. ranged they are placed in an oven having a temperature between fifty five and sixty degrees centigrade. In about five minutes the sections will have become fixed to the slip or cover glass and they are taken out and at once washed with turpentine and mounted in a solution of balsam.

For washing with turpentine a small wash bottle may be used or a pipette.

Staining may be done in toto while in the alcohol or after cutting and fixing. In either case if the object is to pass from one fluid to another it should always be gradually, that is from oil to strong alcohol then seventy, fifty and thirty five per cent and then water, or vice versa

—o—

The last bulletin of the Illinois Experiment Station is an extremely interesting one to the economic entomologist. It contains an account of their very careful and elaborate investigation of the chinch bug disease.

—o—

Tip of abdomen entire
Basin of face striated ..... **verticallis**, Patton
Basin of face punctured
Hind angles of metathorax obtuse
Hind edge of last segment of the abdomen evenly rounded ..... **inusitata**, Aaron
Hind edge of last segment of the abdomen somewhat tapered toward the tip ..... **optima**, Aaron
Hind angles of metathorax produced or pointed
Grooves containing the pits of the last abdominal segment extending nearly to the base ..... **pacifica**, Say
Grooves containing the pits of the last abdominal segment extending nearly to the base ..... **hilaris**, Dahl.
Tip of abdomen notched
Basin of face striated ..... **perpulchra**, Cres.
Basin of the face punctured ..... **densa**, Cres.
Tip of abdomen tridentate ..... **parvula**, Fabr.
Tip of abdomen quadridentate
Prothorax much shorter than the head
Basin of face smooth ..... **dorsalis**, Aaron
Basin of face punctured
Edge of the last abdominal segment nearly straight as seen from the side ..... **cœrulans**, Fabr.
Edge of the last abdominal segment sinuate near the apical teeth
Back of last abdominal segment hollowed out above as seen from the side ..... **inflata**, Aaron

con.

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No. 89. Berkeley California, Apr. 18. 1885.

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The Orders of Insects.

Under the above heading have been considered the various systems of classifying insects. Below is Prof. Comstock's latest ideas on this subject.

1. Thysanura.
2. Ephemerida.
3. Odonata.
4. Plectoptera.
5.* Isopoda.
5.* Corrodentia.
5.* Mallophaga.
6. Dermaptera.
7. Orthoptera.
8. Physopoda.
9. Hemiptera.
11. Neuroptera.
12. Mecaptera.
13. Trichoptera.
14. Lepidoptera.
16.* Diptera.
16.* Siphonaptera.
10. Coleoptera.
15. Hymenoptera.

The numbers have the same significance as as in the former articles. The most striking thing in this system is the position of the order Coleoptera before Hymenoptera.

—o—

COQUILLETT, D. W. 94.
A new Anthrax from California.
Journal N. Y. Ent. Soc. Vol. II. pp. 101-102.
Anthrax edwardsii Coq.*

Chrysis. **Chrysididæ.** (2.) **Hymenoptera.**

Back of last segment of abdomen convex above as seen from the side..... **nortoni**, Aaron O.

Prothorax as long or longer than the head

Last segment of the abdomen with the spines short and blunt

Edge of the last segment of the abdomen straight as seen from the side..... **tripartita**, Aaron A.

Edge of the last segment of the abdomen bisinuate as seen from the side..... **lauta**, Cres.

Last segment of the abdomen with the spines long and sharp..... **propria**, Aaron

Tip of abdomen sexdentate

Last segment os the abdomen hollowed out above as seen from the side..... **intricata**, Brulle

Last segment of the abdomen convex above as seen from above..... **clara**, Cres. A

The insects of this genus are extremely variable. The life history of none of our species is known.

—o—

Weeping Trees.

In the Southern States the largest native leaf hopper Oncometopia undata often becomes so abundant on a tree that there is a continual and very perceptible shower of fluid excrement. That species does not occur in this State but a close relative, a Tettigonia is quite abundant and has the same habit of voiding fluid excrement. Specimens observed a short time ago on blackberry were discharging at regular intervals of between one and two minutes which is about as good as its southern cousin

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No 90. Berkeley California, Apr. 19. 1885.

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Homologies in Veination.

One of the most interesting features of Prof. Comstock's recent work is the homologising of the veins of the wings of Hymenoptera, Diptera and Lepidoptera, He follows to some extent the ideas of Redtenbacher but differs in a number of particulars.

His nomenclature consists in the use of Roman numerals for the primary veins and Arabic numerals for the branches.

In Lepidoptera he considers veins I. IV. and VI. absent. The following shows the relation between this nomenclature with that of Packard.

Comstock	Packard.
II.	Costal.
III.	Subcostal.
V.	Independent.
VII.	Median.
IX.	Submedian.
XI.	Internal.

The importance of vein V. is clearly indicated by Prof. Comstock. It has been commonly confused with veins III. and VII. Vein VIII. is generally represented by a distinct fold.

con.

COQUILLETT, D. W. 94,
Synopsis of the Dipterous genus Symphoromyia.
Journal N. Y. Ent. Soc. Vol. II. pp. 53-56.
Symphromyia modesta Coq.* limbata Coq.* cruenta Coq.* trucis Coq.*

Hind coxæ simple
Front coxal cavities open behind
Antennæ ten jointed ..... Necrophorus.
Antennæ eleven jointed
Front coxal cavities widely open ..... Silpha.
Front coxal cavities narrowly open
Antennæ slender ..... Pteroloma.
Antennæ gradually clavate
Elytra widely margined ..... Necrophilus.
Elytra narrowly margined ..... Agyrtes.
Antennæ suddenly clavate ..... Sphærites.
Front coxal cavities closed behind
Front coxæ not transverse
Abdomen with six segments
Hind coxæ separate ..... Platycholeus.
Hind coxæ contiguous
Middle coxæ contiguous ..... Choleva.
Middle coxæ separate ..... Ptomaphagus.
Abdomen with five segments ..... Colon.
Front coxæ more or less transverse
Antennal club three jointed
Hind feet four jointed ..... Agathidium.
Hind feet five jointed ..... Triarthron.
Antennal club four jointed ..... Cyrtusa.
Antennal club five jointed
Hind feet four jointed
Mesosternum carinate ..... Anisotoma.

con.

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THE ENTOMOLOGIST'S

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 01. Berkeley, California. Apr, 20. 1885.

Homologies in Veination.

con.

The Dipterous wing is more complicated. Comparing the nomenclature with that of Williston the following relation will be noticed:

Comstock.	Packard.
I.	Marginal.
II.	Auxiliary.
III.1.	First longitudinal.
III.2-3.	Second longitudinal.
III.4-5.	Third longitudinal.
V.	Fourth longitndinal.
VII.	Fifth longitudinal.
IX.	Sixth longitudinal.

As in the Lepidoptera the veins IV and VI are wanting. The vein V is three branched with the first two usually fused together and the third fused with the first branch of vein VII. The second branch of this latter vein forms what is known as the posterior basal crossvein but all the other crossveins are recognized as such.

The spurious vein which occurs in Syrphidæ is not considered as a true vein comparable with the other veins of the wing. The author has homologised the abbarent forms within

con.

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Catalogue of the described Tenthredinidæ and Uroceridæ of North America.

Trans. Amer. Ent Soc. Vol. I. pp. 31-84 193-280 Vol. II. pp. 211-242 321-368

Trichiosoma lanuginosa Norton* Dolerus tejoniensis Norton Allantus annularis Norton* interruptus Norton* Macrophyia pluricinctus Norton pumilus Norton calicon.

Silphidæ.	(2.)	**Coleoptera.**
Mesosternum not carinate		**Liodes.**
Hind feet five jointed		**Hydnobius.**
Hind coxæ laminated		**Clambus.**

The Silphidæ are almost exclusively carion beetles. They vary greatly in structure and in general appearance. Nine genera are represented in this region by single species as follows: Necrophilus hydrophilloides Mann. Pteromala tennicorne Lec. Agyrtes longulus Lec. Spharites glabratus Fab. Platycholeus leptinoides Crotch Triarthron lecontei Horn Cyrtusa picipennis Lec. N. Liodes confusa Hofn N. Clambus Seminulum Horn A.

—o—

The Insect Fauna of California.

California has an insect fauna peculiar to its self. No other State has so many forms of limited range. California is to all intents and purposes an island. The mountains and deserts forming quite as effectual a barrier as water. It is not exactly the same as a water barrier in that different insects would be able to pass it. There are five sources from which the aboriginal fauna has received additions by natural means. The first is the north pacific coast fauna. This enters California by the mountain ranges chiefly. The second is the fauna of the region of the great lakes which includes the northern part of the mississippi valley. Many species of this fauna crossing the mountains into Washington and Oregon enter this State as did the north Pacific coast fauna. A third source of immigration is Rocky mountain fauna constituting the bulk of our high altitude species. The fourth accession is from the fauna of the lower Mississippi valley region.

con.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 92. Berkeley California, Apr. 21. 1885.

NORTON, E.
Catalogue etc.
67-9.

formicus Norton fumator Norton* Strongylogaster distans Norton* Tenthredo fumipennis Norton* Lophyrus edwardsi Norton* Lyda pacifica Norton* Phylloecus clavata Norton*

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Homologies in Veination.

con.

the order in a very satisfactory manner.

In the order Hymenoptera the veination is the most complicated. The following is a comparison with the nomenclature adopted by Cresson.

I. Costal vein to node.

III. Subcostal vein.

III.1. Costal vein beyond the node.

III.2-5. in part. Marginal vein.

III.4 in part. Third transverso-cubital vein.

III.5. in part. Second transverso-cubital vein.

V. Cubital vein in part, the rest of the vein consists of vein V.1. and parts of III.4, and III.5, and the stem V.1-2.

V.2 in part. Second recurrent vein.

V.3. in patt. First recurrent vein.

VII. Externo-median vein.

VII.1. Transo-median vein.

IX. Anal vein.

The cross veins form the principal part of the following veins: Basal, First transverso-

con.

Anisotoma. **Silphidæ.** **Coleoptera.**

Mesosternum carinate
Punctures of elytra in distinct striæ
Elytral striæ regular
Alternate striæ with distant punctures.....**collaris**, Lec.
Alternate striæ with closely placed punctures
Color piceous.....**humeralis**, Horn
Color rufo-testaceous.....**difficilis**, Horn
Second and third elytral striæ curved.....**curvata**, Mann.
Punctures of elytra confused.....**paludicola**, Crotch
Mesosternum not carinate.....**ecarinata**, Horn N.

These are small oval insects less than a quarter of an inch in length. They are found on carrion.

—o—

The Insect Fauna of California. Con.

This spreads westward through New Mexico and Arizona into Southern California and northward in the valleys. The fifth source of outside additions to the Californian fauna is that of Mexico. It enters the State by way of Arizona and Lower California and spreads northward in the valleys.

Only the more hardy forms from each of the contributing faunas are able to pass the natural barriers. With the exception of the Rocky mountain fauna the barriers are becoming lessened and the fauna is constantly receiving additions. The lessening of the barriers is due to the introduction of railroads and the increase of traffic on them, the formation of great oases in deserts by irrigation, and for insects injurious to cultivated crops the planting of settlements all over the western States gives the migrating insect an abundant food supply.

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A Californian Journal of Entomology.

No 93. Berkeley California, Apr. 23. 1885.

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Cresson, E. T. 67.
Notes on the Pompilidæ of North America with descriptions of new species.
Trans. Amer. Ent. Soc. Vol. I. pp. 85-150.
Pepsis formosa Say

Homologies in Veination

con.

cubital, and the first section of the discoidal and of the subdiscoidal veins. The remainder of these last two veins are the terminal portions of veins V.3. and V.2. respectively.

This scheme of nomenclature was developed with the wings of the lower Orders of insects as a basis but Prof. Comstock has applied it in this work only to the three orders given above.

What ever ones views on the philosophy of the veination of the wing of an insect it must be acknowledged that the homologies indicated are in almost every case unimpeachable. Indeed we have here for the first time a rational and practical vein nomenclature.

—o—

University of California Entomological Society.

There will be a meeting of the Society in the Entomological Laboratory Saturday May 18th. at 2. P. M. followed by a collecting trip up Strawberry creek. All interested are invited to attend.

Carabidæ.) **Coleopteta.**

Body not pedunculate.....**Metrius.**
Body pedunculate
Hind coxæ separate..... **Promecognathus.**
Hind coxæ contignous
One supra-orbital setigerous puncture.....
.....**Pasimachus.**
Two supra-orbital setigerous punctures
Tarsi slender
Thorax more or less globose....**Dyschirus.**
Thorax more or less quadrate.....**Clivina.**
Tarsi dilated .....**Schizogenius.**
Mesoepimeron not reaching the coxa
Two supra-orbital setigerous punctures
Margin of elytra interrupted posteriorly
Head constricted into a neck and then dilated.....
.....**Panagæus.**
Head not constricted and again dilated
Elytra with an external plica at the interruption.....
.....**Pachyteles.**
Elytra with an internal plica at the interruption
Antennæ with four basal joints glabrous
Body pedunculate.....**Nomius.**
Body not pedunculate.....**Psydrus.**
Antennæ with one or two joint glabrous
Mesoepimera wide
Eyes present
Front tibiæ obliquely truncate at tip.....

con.

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No. 94. Berkeley, California Apr. 24. 1885.

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HORN, G. H.

67.

Description of a new Pseudomorpha from California, with notes on the Pseudomorphidæ.

Trans. Amer. Ent. Soc. Vol. I. pp. 151-154.

Pseudomorpha cronkheitei Horn*

The Smyrna Fig Insect.

The cultivation of the celebrated Smyrna fig has never been a success in this State due it appears to a failure of the fig to fertilize itself Most of the fruit drops while small and that which does come to maturity lacks the flavor of the Smyrna fig. The seeds do not develop but have been made to do so by artificially fertilizing by means of a quill and then the proper flavor is obtained.

In Smyrna there is a practice known as caprification which has existed from time immemorial of placing a few wild or capri figs in each tree of the cultivated variety at a particular season each year.

The result of this process appears to be the fertilization of the figs. The wild figs are infested by minute insects which crawl into the fruit on the tree and effect its fertilization.

The practice is followed generally without the slightest idea of the reason beyond their experience that it is necessary for the crop. Some naturalists believe the practice to be super-

con.

Mesocpimeron reaching the coxa
Scutellum entirely concealed ..... **Omophron.**
Scutellum exposed
Hind coxæ attaining the side margin of the body .....
..... **Tachypachys.**
Hind coxæ not attaining the side margin of the body
Antennæ free or arising under a slight frontal ridge
Front coxal cavities open behind
Labium bifurcate ..... **Cychrus.**
Labium not bifurcate
Third joint of antennæ cylindrical ... **Carabus**
Third joint of antennæ compressed ... **Calosoma**
Front coxal cavities closed
With two supra orbital setæ ..... **Loricera**
With one supra orbital seta
Elytra not striate ..... **Elaphrus.**
Elytra striate ..... **Bleihisa.**
Antennæ arising under a strong frontal ridge
Front coxal cavities open
Inner spur of front tibiæ above the apex.....
..... **Notiophilus.**
Spurs terminal
Mandibles explanate at the sides ..... **Leistus.**
Mandibles not explanate
Front tarsi of males feebly dilated ..... **Nebria.**
Front tarsi of male broadly dilated .. **Pelophila.**
Front coxal cavities closed

con

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A Californian Journal of Entomology.

No 65. Berkeley California, Apr. 25. 1885.

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The Smyrna Fig Insect.

con.

stitious nonsense but those who have given most attention to the subject maintain that there is a sound scientific basis

Many of the details of the process are still enveloped in mystery. The practical problem of the introduction of these insecti in California is one of very great importance to the State. Mr. Geo. C. Roeding of Fresno is now making an earnest effort to accomplish this object and with good promise of ultimate success. Specimens of the insect in the best of condition have been recieved by him from Smyrna and all that remains to be done is to properly care for them here. This may not be a very simple matter however. The means of wintering is a point of some difficulty, for they claim to have a wild evergreen variety there which bridges this gap.

Specimens have been forwarded to the University by Mr. Roeding and much attention will be given to the experiments.

—o—

Horn, G. H. 67.
On Amphizoa insolens, Leconte.
Trans. Amer. Ent. Soc. Vol. I. pp. 154-158.
Amphizoa insolens Lec.

Antennæ free at base
Scutellum concealed ..... Casnonia.
Scutellum distinct
Neck very narrow
Clypeus with two setigerous punctures on each side..... Galerita
Clypeus with one setigerous puncture on each side ..... Zuphium.
Neck stout
Thorax truncate at base ..... Diaphorus.
Thorax subpedunculate at base.... Thalpius.
Antennæ arising under a slight frontal ridge
Tibial spurs very long..... Tetragonoderes.
Tibial spurs not very long
Mandibles with distinct scrobes
Head constricted behind the eyes..... Lebia.
Head not constricted behind the eyes
Tarsi with fourth joint slender
Ungues simple..... Apristus.
Ungues serrate
Labial palpi slender..... Blechrus.
Labial palpi thick..... Anixopalpus.
Tarsi with fourth joint emarginate or bilobed
Ungues simple ..... Tecnophilus
Ungues serrate
Thorax truncate at base

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 97. Berkeley California, Apr. 27. 1885.

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HORN, G. H. 67.

Descriptions of new Genera and Species of Western Scarabidæ, with notes on others already known.

Trans. Amer. Ent. Soc. Vol. I, pp. 163-170.

Phæochrous behrensii Horn* Dasydera cooperi Horn* Lichnanthe canina Horn* O. Acratus flavipennis Horn* A. Plectrodes pubescens Horn* Cotalpa ursina Horn*

Examination Questions.

We print below the questions at the examination of the class in elementary and economic entomology.

1. Enumerate and define ten structures on the head of insects.

2. Describe in detail the structure of a leg or wing.

3. Give a general account of the internal structure of insects.

4. Name five orders of insects and give their characteristics.

5. Name five families in one order and give some account of the insects comprising them.

6. Mention five species of economic importance and give treatment.

7. Describe the formation and use of synopses for the determination of insects.

8. How many segments belong to head and thorax? Give reasons.

9. Describe the process of walking.

10. Contrast the circulation and respiration of insects with that of higher animals.

11. Compare labium and maxilla.

con.

Tarsi with the fourth joint bilobed....
.....Callida.
Tarsi with the fourth joint emarginate
Tarsi not hairy above
Last joint of labial palpi triangular
Base of thorax oblique on each..
.....Phyllophuga.
Base of thorax squarely truncate
.....Plochionus.
Last joint of labial palpi cylindrical.....Pinacodera.
Tarsi hairy above.....Cymindis.
Thorax lobed at middle of base Apenes.
Mandibles without scrobes.....Pentagonica.
Hind coxæ separated.....Ega.
One supra-orbital setigerous punctures
Mesocepimera wide.....Brachynus.
Mesocepimera narrow
Margin of elytra interrupted posteriorly
Eyes not truncate behind.....Chlænius.
Eyes truncate behind.....Oodes.
Margin of elytra not interrupted posteriorily
Clypeus with not more than one setigerous punctures at the angles on each side
Antennæ with but two joints glabrous
Labial palpi with the next to the last joint plurisetose in front

con.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 98. Berkeley California Apr. 29. 1885.

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EDWARDS, W. H. 69.
Descriptions of certain species of Diurnal Lepidoptera found in the United States.
Trans. Amer. Ent. Soc. Vol. II. pp. 311-312,
Hesperia nebulae Edw.*

Examination Questions.

con.

12. Describe the embryological development of an insect.

13. Describe the metamorphoses of insects.

14 Give an account of the organs of special sense in insects.

15. Describe the digestive apparatus of insects.

The time of the examination was three hours. The questions were divided so each student had but nine to answer

The course embraces about thirty recstation periods of fifty minutes each.

—o—

Borers.

Since the publication in the Post Card of the article on the peach borer our attention has been called to two other borers doing much injury to this class of trees.

The largest of our beetles Prionus californicus seems to be a pest of considerable importance in prune orchards.

The other the well and unfavorably known Chrysobothris femorata attacking plums and prunes.

Body pedunculate..... ..... **Stenomorphus.**
Body not pedunculate
Outer apical angle of front tibiæ prolonged...
.... **Nothopus.**
Outer apical angle of front tibiæ not prolonged
Elytra with not more than one dorsal puncture ..... **Harpalus.**
Elytra with three series of dorsal punctures
Middle tibiæ arcuate ..... **Discoderus.**
Middle tibiæ straight..... **Selenophorus.**
Labial palpi with the next to the last joint bisetose
Front and middle tarsi of the male with the next to the last joint bilobed..... **Stenolodhus.**
Front and middle tarsi of the male with the next to the last joint simply emarginate
Mentum not toothed
Front tarsi of the male simply spinose beneath..... **Agonocerus**
Front tarsi of the male biseriately squamulose
..... **Acupalpus.**
Mentum toothed..... **Bradycellus.**
Antennæ with three glabrous joints... **Tachycellus.**
No supraorbital setigerous punctures **Pseudomorpha.**

The Carabidæ includes a very large number of our commonest beetles. They are to be found under boards and stones as are also the larvæ and species are predaceous though some feed to a considerable extent on pollen and other vegetable substances.

—o—

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THE ENTOMOLOGIST'S

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 99. [illegible] May 2. 1885.

LECONTE, J. L. 68.

New Coleoptera collected on the Survey for the extension of the Union Pacific Railway, E. D. from Kansas to Fort Craig, New Mexico.

Trans. Amer. Ent. Soc. Vol II. pp. 49-59.

Ochodaeus serriatus, A. Costinoptera subfasciata Lec.* A.

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Nomenclature of Veins.

In the May number of Psyche Prof. A. S. Packard presents his views upon this subject which are in full accord with the latest investigations of Spuler They differ decidedly from the views of Redtenbacher whose naming was esentially that followed by Comstock. Below is a comparison of these two systems.

Comstock,	Packard
II	I. Costa
III.	II. Subcosta
V.	III. Media,
VII.	IV Cubitus.
IX.	V. First anal.
XI.	VI. Second "
	VII. Third "

The difference is chiefly dependent upon the conception as to the primitive type of veination According to Redtenbacher we find the typical veination in the wing of an ephemerid while Spuler thinks he finds it in the pupa of a moth.

Upon the whole Packard's system in that it degrades to a subordinate position Redtenbacher's veins I IV. VI. VIII. and X. seems to be preferable.

We will treat of this subject more fully tomorrow.

Terminal spur of front tibiæ trifed
Thorax distinctly narrowed behind
Hind angles of thorax obtuse
Intervals of elytra regularly punctate
Sides of thorax beneath not punctate...**strenus,** Horn
Sides of thorax beneath punctate ...**punctate,** Dej.
Intervals of elytra irregularly punctate
Spurs of hind tibiæ slender and acute
Hairs of surface short.....**obtusus,** Lec.
Hairs of surface long.....**pilosus,** Horn
Spurs of hind tibiæ short .....**immanis,** Horn.
Hind angles of thorax sharply rectangular **brunneus,** Dej.
Thorax scarcely narrowed at base..... ... **piceus,** Men.
Terminal spur of front tibiæ dilated at tip
Hind coxæ slender
Intercoxal process punctured.....**semipunctatus,** Lec.
Intercoxal process smoth
Basal impressions of prothorax broad and shallow.....
..... **consobrinus,** Lec.
Basal impressions of prothorax linear and deep. ....
..... **californicus,** Dej.
Hind tarsi flattened
Clypeus with one setigerous puncture on each side.....
.... **nivalis,** Horn
Clypeus with two setigerous punctures on each side
Intervals of elytra punctate near the apex only.....
..... **pityochorus,** Lec.

con.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 100. Berkeley California, May 3. 1885

CRESSON, E. T.

67.

A list of the Ichneumonidæ of North America with descriptions of new species.

Trans. Amer. Ent. Soc. Vol. I. pp. 289-312. Vol. II. pp. 89-114.

Ichneumon californicus Cress.

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Examination in Apiculture.

The following are the questions set this year at the conclusion of the course in bee keeping:

1. Give conditions favoring swarming and those preventing it.

2. What are the conditions favoring drone production, wax secretion and bee moth injury

3. When are queens produced, when fertilized, and when are fertile workers to be feared.

4. Describe in detail the structure of one of the legs.

5. Name and describe the principal sense organs.

6. Give the chief structural differences between the three kinds of bees in a hive.

7. Describe the methods of honey extraction, of wax extraction.

8. Explain the advantages of foundation and the process of its manufacture.

9. Describe the manipulations in natural and artificial increase

The course embraces about thirty recitation periods of fifty minutes each.

Intervals of elytra punctate their entire length.....
....**porosus,** Motsch.
Terminal spur of front tibiæ slender.....**amaroides,** Lec.

—o—

The Significance of the Veins of the Wings of Insects.

There is one important consideration which seems to have escaped the attention of the numerous investigators of the veination of the wings of insects and which throws much light upon the questions at issue It is the subject of the dynamical cause of the arrangement of the veins. We can give here but the briefest outline of subject as presented in the course in the advanced course in Structural Entomology.

The original wing or its progenitor was of course veinless. The vein is a structure developed to stiffen wing. The functionally primary vein is the one which corresponds with the rib of a feather, that is Comstock's vein III. commonly called the subcostal. The next vein to be needed is one to stiffen the larger area to the rear of the primary vein. This is accomplished by the development of a vein from the base approximately bisecting this area. Thus arises the vein VII. sometimes called median but more commonly cubitus This process may be repeated whenever the margin of the wing increases in extent so as to require further stiffening. If the enlargment is not at the base the added stiffness is produced by the branching of the first two veins. The development of the veins between the first two veins presents a different history. Here two strong veins diverge at a greater angle than at any other part of the wing. The membrane enclosed

con-

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY

No. 101. Berkeley California. May 3. 1895.

HORN, G. H.

68.

New species of Coleoptera from the Pacific District of the United States.

Trans. Amer. Ent. Soc. Vol. II. pp. 129-140.

Omus subcostatus Horn* Pachyceles testaceus Horn* A. Tetragonoderus pallidus Horn* Anisodactylus strenus Horn* Euthecia colon Horn* A. platynon leconteii Horn* Xanthopygus cacti Horn* A. S haerius politus Horn* Oreonis lugubris Horn* O dyscentus cuneatus Horn* obliteratus Lec Cymatodera californica Horn* Anthicus nero Spin. Helchoera robusta Horn* Acrepis 4 signata Horn* Coccotorus mater con.

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Food plants of Californian Lecaniums.

We have obtained from Miss M. W. Tyrrell the following list of food plants of the Lecaniums found in the State These insects are found occasionly on almost all plants but the following list only includes plants on which she has found them in numbers.

1. Lecanium oleæ, Bern. the "black scale" our most common species

Food plants.— Abutilon, Apricot, Baccharis, Lemon, Myrtle, Oleander, Olive, Orange, Peach. Pelargonium, Pittisporium, and Pomegranite.

2. Lecanium pruinosum Coq. the "frosted scale" and the "red apricot scale" both varieties of the same species. The scientific name will doubtless have to be changed in favor of some older one

Food plants.— Apricot, Locust, Oak, Oranae, and Peach.

3. Lecanium hesperidum. Linn the "flat scale" or "soft scale" of the orange.

Food plants.— Apricot, Ivy. Lemon, Oleander, and Orange.

con.

Brachycelus **Carabidæ.** **Coleoptera.**

Head punctured near the eyes posteriorly . . . **cognatus**, Payk
Head smooth
Hind angles of thorax obtuse
Thorax obliquely subsinuate near the base, basal impressions strongly punctured . . . . . **rupestris**, Say
Thorax scarcely sinuate near the base, basal impressions sparcely punctured . . . . . **tentillus**, Dej.
Hind angles of thorax rectangular or nearly so . . . . . .
. . . . . **calfornicus**, Lec,

—o—

The Significance of the Veins of the Wings of Insects.

con

does not require any stiffening near the base but does towards the tip and so we find developed here a vein arising from the edge instead of the base. In other words the different kind of strain the membrane is subjected to at this point requires a different kind of support. It is a different mechanical problem. The same problem is repeated between all the veins arising from the base but to a less degree. This is the origin of many of Adolph's concave veins. The marginal vein of course has a different origin from the other veins. The three types of veins are thus basal apical and marginal.

The membrane between the primary veins is normally concave as seen from above so that the tension of the down stroke make the membrane more rigid instead of bagging it. It thus happens that a vein developed between two previously existing veins is necessarily concave. A concave vein is therefore only a later developed vein.

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DAILY POST CARD.

A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No 102. Berkeley California, May 4. 1895.

HORN, G. H. 68. (2.)

New species etc.

Horn* Mycterus flavipennis Horn* O. concolor Lec. Mecynotarsus delicatus Horn* Rhinoplatia ruficollis Horn* Prosternus californicus Horn* Porcospasta polita Horn* Megetra opaca Horn* Nonaspis sublaevis Horn* Languria convexicollis Horn*

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Food plants of Californian Lecaniums. con.

4. Lecanium insigniccola, Craw the "pine scale" The scientific name of this insect was given by Prof Riley years ago but never published till Mr Craw mentions it in one of the Reports of the State Board of Horticulture

Food plants.— Cherry and Pine.

5. Lecanium hemisphericum, Targ. the commonest hot house Lecanium. It does not appear to be able to establish itself out of doors.

Food plants.— Palms and tropical plants generally.

6. Lecanium tesselatum, Sig living exclusively in hot houses.

Food plants.— Palms and tropical plants generally.

—o—

University of California Entomological Society.

There will be a meeting of the Society in the Entomological Laboratory Saturday May 18th. at 2. P. M. followed by a collecting trip up Strawberry creek. All interested are invited to attend.

—o—

Front tarsi without lateral grooves
Elytra with no humeral angles
Front tarsi with median grooves ..... **larvalis**, Lec.
Front tarsi without median grooves
Color black ..... **jejunus**, Lec.
Color brown ..... **agilis**, Lec.
Elytra with rounded humeral angles
Hind angles of prothorax obtuse ..... **ovipennis**, Lec.
Hind angles of prothorax rectangular ..... **sinuatus**, Det
Front tarsi with lateral grooves
Hind angles of prothorax rounded
Prothorax widely margined .. **brunneomarginata**, Mann.
Prothorax narrowly margined
Elytra with five to seven dorsal punctures
Legs pale
Basal impression of prothorax deep .....
..... **extensicollis**, Say
Basal impression of prothorax small, narrow
Prothorax blue or green ..... **simplex**, Lec
Prothorax yellowish ..... **decorus**, Say
Legs black
Color black, bronzed ..... **californicus**, Dej.
Color greenish and testaceous ..... **bicolor**, Dej.
Color brown ..... **ferruginosus**, Lec.
Elytra with three dorsal punctures
Color brassy black
Hind angles of prothorax rectangular
con.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 103. Berkeley California. May 6. 1895.

LECONTE, J. L.
68.
Appendix. [to Synopsis of the Scolytidæ of America North of Mexico by C. Zimmermann, M. D.]
Trans. Amer. Ent. Soc. Vol. II. pp. 150-178.

Cryphalus scutellaris Lec. cavus Lec.* dentiger Lec.* retusus Lec.* sulcatus Lec.* pubipennis Lec. pilosulus Lec.* striatus Lec.* atratulus Lec.* Tomicus cacographus Lec.* A. plastographus Lec.* Scolytus californicus Lec.* Hylesinus imperialis Erich. A. sericeus Mann. nebulosus Lec. dentatus Say O. cristatus Lec. hystrix Lec. Dendroctonus terebrans Lec. obesus Mann. O. Hylastes nigrinus Mann. gracilis Lec.* con.

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The Season.

The most notable entomological features of the season have been, the great abundance of lady birds during the winter and early spring, their almost complete dissappearance from for some unknown cause, the early appearance and great abundance of plant lice and their attendant parasites and now the spread of disease among them which in many cases has quite eradicated the insects. Other striking features of the season were the unusual abundance of hibernating insects especially butterflies early in the season and a relative scarcity of those that appear later in the spring. The season seems to have been a good one for ants probably due to some extent to the abundance of the plant lice. Another interesting matter is the great abundance of a couple species of beetles belonging to the family Lampyridæ. These insects have been surprisingly efficient against the plum aphis. They are well worthy of study with a view to their economic use

con

Hind angles of prothorax obtuse...**quadratus,** Lec.
Color opaque black ..... **funebris,** Lec.
Hind angles of prothorax rounded
Elytra not deeply emarginate at base
Elytra with three dorsal punctures
Second puncture on the second stria .....
.....**cupripennis.** Say
Second puncture on the third stria.....**frater,** Lec.
Elytra with more than three dorsal punctures
Legs pale
Prothorax more or less yellowish
Punctures of elytra large.....**maculicollis,** Dej.
Punctures of elytra small.....**variolatus,** Lec
Prothorax piceus
Base of prothorax strongly emarginate.....
.....**sulcatus,** Dej.
Base of prothorax feebly emarginate **striatus,** Dej.
Legs black
Hind angles of prothorax rounded....**fossiger,** Dej.
Hind angles of prothorax not rounded.....
.....**deplanatus,** Men.
Elytra deply emarginate at base .....**obsoletus,** Say

—o—

The Department of Agriculture at Washington has just issued the first part of a bibliography of economic entomology compiled by Mr Samuel Henshaw of Harvard University whose name is a sufficient guarantee of its completeness and accuracy. It will prove of great value to economic entomologists

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No 104. Berkeley California, May 7. 1895.

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The Season con.

The meaning of the observations presented would appear to be that an open winter is decidedly favorable to successful hibernation In colder regions this is not supposed to be the fact but the contrast is not so striking upon closer consideration. In more northern regions an open winter is a variable winter and awakenings exhausts in some way the vitality of the hibernating insects. Here on the contrary an open winter is one with a less amount of cold snaps, that is a more even winter, one keeping most closely to the normal temperature.

The conditions favoring the hibernation of injurious insects are likewise favorable to the hibernation of their parasites so that the result of an open winter may be an early abundance of an insect but it is very likely to be followed very soon by a great decrease and the season will be marked as one of great insect oscillations.

Another fact emphasised by this year's experience is the extremely important part play-

con.

LECONTE, J. L. (2.)

Appendix. etc. 68.

macer Lec.* porosus Lec.* granulatus Lec.* O. rugipennis Mann. subcostulus Mann. Bostrichus terminalis Mann.

Elytra with no dorsal punctures
Hind feet stout
Joints of hind feet inflated at tip.....**morionides**, Chaud.
Joints of hind feet not inflated.....**tarsalis**, Lec.
Hind feet slender
Prosternum margined behind
Base of prothorax margined towards the sides
Sides of prothorax creno-dentate..**crenicollis**, Lec O.
Sides of prothorax entire
Humeral angles dentiform
Hind angles of prothorax distinctly carinate.....
.....**herculanum**, Mann. O.
Hind angles of prothorax only feebly explanate
Scutellar stria long.....**scutellatis**, Lec.
Scutellar stria short.....**amethesrinus**, Dej. O.
Humeri not dentiform
First joint of hind feet with two distinct grooves on the outer side
Prothorax somewhat narrowed behind
Outer basal stria of prothorax small but distinct
Base of prothorax flattened **protractus**, Lec.
Base of prothorax not flattened **validus**, Dej
Outer basal stria of prothorax indistinct.....
.....**vicinus**, Mann.
Prothorax not narrowed behind..**angustus**, Dej
Hind feet with only traces of grooves.....
.....**californicus**, Dej.

con.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 105. Berkeley California. May 8. 1895.

LECONTE, J. L.

69.

Synonymical notes on Coleoptera of the United States, with descriptions of new species, from the MSS. of the late Dr. C. Zimmermann.

Trans. Amer. Ent. Soc. Vol. II. pp. 243-269.

Ochthidromus pardalis Zim. Hydrophilus limbalis, Epicris planulus Er. Ateuchus lecontei Lec.

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The Season. con. ed by fungus diseases. For rapid and complete destruction of an insect no other parasite can compare with the appropriate fungus It is true however that fungi are thoroughly ineffectual except under particular conditions of the weather.

Insects are not always reliable as shown by the history of the lady birds this season. The failure in this case appears to be a loss of fertility for a very small number of eggs were laid. Lady birds like most comparatively long lived insects generally die at last of some fungus disease. It is quite probable in this case that the insects became infested earlier than usual and the disease prevented the perfection of the eggs. This is the ordinary result of a diseased condition and all the facts of the case point to this conclusion.

—o—

Bulletin No 29 of the Hatch (Mass.) Experiment Station contains the plan of a very good form of "agitator" for preventing Paris green settling while spraying.

Base of prothorax not at all margined
Hind feet not grooved on the outer side .....
.....**menetriesii,** Motsch.
First joint of hind feet with two grooves on the outer side
Scutellar stria long
Prothorax little narrowed behind.....
.....**castanipes,** Men.
Prothorax much narrowed behind
Hind angles rectangular
Tarsal grooves extending on to the second joint
.....**spraguei,** Lec. N.
Tarsal grooves only on the first joint.....
.....**gracilior,** Lec.
Hind angles obtuse..... **hornii,** Lec.
Scutellar stria short
Prothorax as wide as long.....**isabellæ,** Lec.
Prothorax longer than wide.. .**cnngestus,** Men.
Prosternum scarcely or not at all margined
Outer basal stria of prothorax distinct....**planetus,** Le c.
Outer basal stria of prothorax wanting.**longicollis,** Lec.
Elytra with dorsal punctures
Last joint of palpus truncate at tip
Prosternum margined behind
Sides of prothorax not depressed
Prothorax sinuate on the sides
Not punctured beneath.....**subcordarus,** Lec·
con.

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A Californian Journal of Entomology.

No 106. Berkeley California, May 9. 1895.

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Cresson, E. T. 69.
A list of the North American species of the genus Anthophora, with descriptions of new species
Trans. Amer. Ent. Soc. Vol. II. pp. 289-293.
Anthophora californica Cress.*

The Experiment Station Entomologists.

From the Organization Lists of the Agricultural Experiment Stations, a Bulletin of the U. S. Department of Agriculture we note the following Entomologists:

Alabama.	J. M. Steadman.
	C. G Green.
Arizona	J W. Toumey.
California.	C. W. Woodworth.
Colorado.	C. P. Gillette.
	C. F. Baker.
Delaware.	M. H. Beckwith.
Florida.	P. H. Rolfs.
	A. L. Quaintance.
Idaho.	J. M. Aldrich.
Illinois.	S. A. Forbes.
Iowa.	H. Osborn.
	C. W. Mally.
Kansas.	E. A. Popenoe.
	F. A. Marlatt.
Kentucky.	H. Garman.
	J. S. Terrill.
Louisianna.	H. A. Morgan.
Maine.	F. L. Harvey.
Maryland.	C. V. Riley.
Massachusetts	C. H. Fernald.
	C. P Lounsbury.
Michigan.	G. C. Davis.
Minnesota.	O. Lugger.
Mississippi.	H. E. Weed.

con.

Meso- and metathorax punctured beneath .....
....**lætulus,** Lec.
Prothorax very feebly or not at all sinuate at the sides.
....**occidentalis,** Dej.
Sides of prothorax depressed..... **lucublandus,** Say
Prosternum not margined behind
Elytra with three dorsal punctures
Humeri dentiform.....**caudicalis,** Say O. N.
Humeri not dentiform.....**lustrans,** Lec.
Elytra with five or six dorsal punctures
Sides of prothorax rather broadly depressed
Hind angles rectangular..... **vitreus,** Dej.
Hind angles obtuse.....**orinomum,** Lec. O.
Sides of prothorax narrowly depressed
Hind angles rectangular.....**oregonus,** Lec. O.
Hind angles obtuse.....**luczotti,** Dej O.
Last joint of palpus not truncate at tip..**splendidulus.** Lec.

—o—

Injurious Leaf-chafers.

In the upper San Joaquin valley there is considerable complaint almost every year of injury to the foliage of young fruit trees by leaf-chafers mostly belonging to the genera Serica, Hoplia and Macrodactylus. The injury they do is quite serious but fortunately the time of injury is comparatively brief

At the present time in Fresno County Hoplia sackeni Lec. is more than usually abundant and doing considerable injury It attacks vines as well as fruit trees.

—o—

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Published by the
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THE ENTOMOLOGIST'S

DAILY POST CARD.

A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 107. Berkeley California, May 10. 1895.

The Library
of the
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BEHR, H.

69.

Descriptions of a new genus of Pieridæ, and ceatain new species of butterflies from California

Trans. Amer. Ent. Soc. Vol. II. pp. 303-304.

Neophasia menapia Feld, terlooii Behr* Anthocaris edwardsii Behr* cooperii Behr*

The Experiment Station Entomologists. con.

Nebraska.	L Brunner
	H G. Barber.
Nevada .	F. H Hillman
New Hampshire	C. M. Weed.
New Jersey.	J. B, Smith.
New Mexico.	T. D A. Cockerell.
New York. [State]	
	F. A. Sirrine.
	V. H. Lowe.
New York. [Cornell]	
	J. H. Comstock.
	M. V. Slingerland.
North Carolina	G McCarthy.
Ohio	F. M. Webster.
Oklahoma.	J. C. Neal.
	A. N. Caudell.
Oregon.	F. L Washburn.
South Dakota.	T. A. Williams.
Tennessee.	C. E. Chambliss.
Utah.	E. S. Richman.
Vermont.	G. H. Perkins.
Virginia.	W. B. Alwood.
Washington.	C. V. Piper.
West Virginia.	A. D. Hopkins.
	W. E Rumsey.

When two names appear in one Station the second is usually that of the assistant.

—o—

The field meeting of the society occurs next Saturday afternoon.

Third joint of antennæ not longer than the fourth
Prosternum not margined at tip
Prosternum punctured..... **intercuptus,** Horn O.
Prosternum not punctured..... **harpalinus,** Esch.
Prosternum margined at tip
Elytral intervals finely muricate....**pennsylvanicus,** Say
Elytral intervals finely and sparsely punctured
Procpisterna coarsely punctured.. .....**tricolor,** Dej
Procpisterna very obsoletely punctured
Thorax shining
Head and thorax above green
Labrum emarginate..... **glaucus,** Lec
Labrum not emarginate
Thorax distinctly sinuate at the sides.....
....**simillimus,** Chaud.
Thorax not sinuate.....**nebraskensis,** Lec N.
Black above ....**variabilipes,** Esch.
Thorax opaque.....**obsoletus,** Lec.
Third joint of antennæ longer than the fourth
Abdomen not punctured beneath
Color bright green..... **validus,** Chev A.
Color dark blue.....**cumatilis,** Lec
Abdomen punctured only at the sides
Color bright green ..... **solitarius,** Say
Color dark blue .....**leucoscelis,** Chev.
Abdomen punctured clear across beneath
Antæ; imera long

con.

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THE ENTOMOLOGIST'S

DAILY POST CARD.

A Californian Journal of Entomology.

No 108. Berkeley California, May 11. 1895

EDWARDS, W. H. 69.

Descriptions of new species of Diurnal Lepidoptera found within the United States.

Trans. Amer. Ent. Soc. Vol. II. pp. 269-376.

Anthocaris reakirtii Edw.* Argynnis behrensii Edw.* Grapta oreas Edw.* Canonympha brenda Edw.* Thecla chalcis Edw.* Lycaena oreas Edw.*

The Library
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Laboratory Manual.

We are pleased to be able to announce that we have arranged to give in weekly installments a new laboratory course in entomology entitled:

Laboratory Manual
FOR THE COURSE IN
Elementary Microscopical ENTOMOLOGY,
AT THE
University of California
BY
C. W. Woodworth,

General directions. — The work is outlined mostly hour by hour as a general guide rather than as absolute divisions.

Note books should be handed in monthly. Select the elective work early.

Microscopes and other apparatus will be furnished by the University

Each student is expected to be provided with a note book of smooth unruled paper, pencils, a half inch Coddington magnifier, one half gross of 1x3 glass slips, one fourth ounce of covers, three 25-slide mailing boxes, one tube of balsam, and blotters and cloth for cleaning slides

Elytra all of one color
Thorax sparsely punctured ..... **cursor,** Chev.
Thorax densely punctured
Prosternum sparsely punctured ..... **viridifrons,** Esch.
Prosternum densely punctured
Front femora of male with a short spine near the base ..... **laticollis,** Say A.
Front femora of male narrowed at base and not spined ..... **sericeus,** Forst.

—o—

Some Recent Eastern Insect Bulletins.

The New York, Delaware, and Michigan Agricultural Experiment Stations have each recently issued general bulletins upon spraying. The following are the insects noted: On Apple codlin moth, (the only one noted in all three bulletins,) canker worms, bud moth, case bearer, and borers On Apricot the curculio. On Bean the weevil On Cabbage the aphis, worm and maggot On Cherry the slug, aphis and curculio. On Currants and Gooseberries, worms. On Grape the flea-beetle. On Pea the weevil. On Peach the curculio and borer. On Pear the codlin moth, psylla, slug, bud moth and case bearer On Plum the curculio On Potato the flee beetle and Colorado beetle. On Quince the codlin moth, curculio and borers. On Strawberries the white grubs. The above list of about a score of species covers all the more important insect enemies of fruits and vegetables in the eastern States. Nearly half of them are still unknown in this State. Their place is more than filled however by our scale insects.

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Post Card Publishing Company,
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THE ENTOMOLOGIST'S

DAILY POST CARD.

A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 109. Berkeley California, May 13. 1895.

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Laboratory Manual. Aa.
FIRST WEEK.

NEEDED. — A number of any of the common species of house-flies, freshly killed,

FIRST HOUR. — Observe and describe briefly the appendages. carefully remove the legs from one side and place them for about five minutes in strong alcohol. Put a drop of oil of cloves on the center of a glass slip. Remove the legs from the alcohol and after draining them an instant on a blotter transfer them to the drop of oil on the slip. After two or three minutes soak off the oil with a blotter, arrange the legs, put a very small drop of balsam on them and lay a cover glass over them If the proper quantity of balsam has been used it will just fill the space between the glasses. If not enough has been used a small drop placed at the edge of the cover will run under. An excess may be taken up with a blotter. The legs may be rearranged after the cover is put on by means of a fine wire or bristle Label the slide giving date, name of object and mounting material.

COLLIER, P.
95.
The San Jose, or Pernicious Scale.
Bulletin No. 87. New York Agricultural Experiment Station
Aspidiotus perniciosus Comst.

Elytra with the third stria or interspace tripunctate
Basal stria of elytra entire
Clypeus tridentate ..... **tridentatus,** Lec.
Clypeus bidentate
Antennæ black ..... **patruelis,** Lec.
Antennæ reddish ..... **basalis,** Lec.
Basal stria of elytra wanting
Front with a slight transverse impression
Thorax slightly transverse ..... **intiger,** Lec.
Thorax globose
Striæ of elytra strongly punctate ... **consobrinus,** Lec.
Striæ of elytra sparsely punctate
Striæ of elytra not interrupted behind the middle ... **gibbipennis,** Lec.
Striæ of elytra interrupted behind the middle ..... **lævifasciatus,** Horn O.
Front with deep transverse impressions
Antennæ black ..... **aeneolus,** Lec.
Antennæ reddish
Striæ of elytra feebly punctate ..... **terminatus,** Lec.
Striæ of elytra strongly punctate ..... **analis,** Lec.
Elytra with the third interspace bipunctate or impunctate
Front tibiæ not dentate on the outer side
Thorax oval ..... **marinus,** Lec
Thorax broader behind ..... **obesus,** Lec.
Front tibiæ dentate on outer side ..... **aratus,** Lec.

—o—

No paper Wednesday. Commencement.

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DAILY POST CARD.

A Californian Journal of Entomology.

No. 110. Berkeley California, May 14. 1895.

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Laboratory Manual. Ab.

Second hour. — Examine the specimens carefully and make such other mounts as may be needful to enable you see distinctly all the structures on the legs.

Third hour. — Draw a leg and name the parts as follows begining at the body: coxa, trochanter, femur, tibia, and tarsus the latter consisting of five joints and having at the tip a pair of claws, called ungues and between them two soft fleshy organs the pulvilli.

In making the drawing it is decidedly preferable to make a great many sketches instead of one finished drawing. Especially to be discouraged is the use of the eraser. Unless a mistake is allowed to stand it will not aid in the production of a more accurate outline.

Care must be exercised in handling freshly prepared slides not to smear the balsam on the microscope. In case such an accident should occur attention should be called to it at once that it may be cleaned.

The slides should be referred to by number in the note book.

Washburn, F. L.

94.

Progress of work.

Bulletin No. 31. Oregon Agricultural Experiment Station.

Chionaspis eroso Stretch O. plurialis Dyar O. constricta, O. Phyllotreta decipiens, O. Hadena devastatrix, O. Onus californicus, O. Pterostychus californicus, O. Cicindella 12-guttata, O. Largus succinctus, O. Leptocoris trivittatus, O. Buprestus aurulentus, O. Cicada arcolata, O. Corymbetes fabrax, O. cylindriformis, O. Dicerca lineicollis, O. Chrysobothris femorata, O. Polycaon confertus, O. Chrysobothris femorata, O. Pseudohazis eglanterina, O. Polyphylla decimlineata, O. Schizoneura lanigera, O. Aspidiotus perniciosus, O. Mytilaspis pomorum, O.

Cucujidae. **Coleoptera.**

Front coxal cavities open behind
Maxillæ concealed by horny plates
Jugular plates broad ..... **Catogenius.**
Jugular plates long and acute ..... **Prostomis.**
Maxillæ exposed
First joint of antennæ moderate in length
Prosternum narrow
Hind angles of head prominent ..... **Cucujus.**
Hind angles of head not prominent ..... **Pediacus.**
Prosternum wide
Spurs of front tibiæ unequal ..... **Laemophlœus.**
Spurs of front tibiæ equal ..... **Lathropus.**
Front coxal cavities closed behind
Thrid joint of feet not lobed
Club of antennæ formed abruptly ..... **Silvaous**
Club of antennæ formed gradually ..... **Nausibius.**
Third joint of feet lobed
Last joint of maxillary palpi enlarged at tip. **Telephanus.**
Last joint of maxillary palpi slender at tip **Cryptamorpha**

—o—

Figs from Mexico.

Mr. G. C. Roeding whose importation of figs containing the Blastophaga has been noted in a recent issue has now received his first consignment of figs from Mexico. Insects related to the Smyrna species are said to be abundant in Mexico and that they may be made to serve the same purpose. This lot does not contain any of the insects.

—o—

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University of Calif. Ent. Society
Entered at the post office at
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Subscription $2.00 per year.

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THE ENTOMOLOGIST'S

DAILY POST CARD.

A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 111. Berkeley California, May 16. 1895.

Further notes on Caprification.

We have received a very interesting communication from Mr Anthony C Denotovich a native of Smyrna who is much interrested in the importation of the blastophaga, being the party through whom Mr Roeding obtained the Smyrna importation.

The wild fig known as the ornios boghades in which the insect appears to pass the winter, does not contain pollen as ordinary capra fig, the ornios ashmadhes. About the first of Feburary they contain a small wingless insect doubtless the male blastophaga. In about a month the males have died or disappeared and winged insects in abundance are found in their place These are the females which lay the eggs in the ordinary capri fig

The process of caprification as preformed by the natives of Smyrna consists in going to the mountains between the middle of June and the middle of July and gathering the wild figs but from the vicinity of trees of the

con.

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EDWARDS, W. H. 70
Descriptions of New Species of Diurnal Lepidoptera found within the United States.
Trans. Amer. Ent. Soc. Vol. III. pp. 10-22.
Parnassius behrii Edw.* Colias edwardsii Behr* N. emilia Edw.* O. ariadne Edw.* Argynnis nevadensis Edw.* N. Grapta silenus Edw.* O. zephyrus Edw.* N. marsyas Edw.* Thecla behrii Edw.* Chrysophanus cuyreus Edw.* O. hermes Edw.* virginiensis Edw.* N.

Second joint of antennæ shorter than the third
Labrum emarginate
Surface densely punctured ..... **biguttatus**, Say.
Surface rather lightly punctured ..... **fasciatus**, Mels.
Labrum entire
Elytra shorter than the abdomen ..... **modestus**, Say.
Elytra as long as the abdomen ..... **adustus**, Lec.
Second joint equal to or longer than the third
Head having transverse groove
Front angles of prothorax toothed ..... **testaceus**, Fab.
Front angles of prothorax not toothed ..... **nitens**, Lec.
Head having no transverse groove
Head with a median furrow
Front angles of the prothorax acute.. **pubescens**, Casey
Front angles of the prothorax square
Prothorax narrower than the head..... **alternans**, Er.
Prothorax as wide as the head... **ferrugineus**, Steph.
Head with no median furrow
Sides of prothorax deeply undulate..... **horni**, Casey
Sides of prothorax straight or feebly arcuate.
Color black ..... **cephalotes**, Lec.
Color reddish..... **pusillus**, Schon.

—o—

Vine Hoppers.

The vine hopper commonly known as the thrips is an insect that fluctuates greatly in numbers from year to year. Two years ago it was injurious over a wide area. Last year it did scarcely any injury. It now appears in destructive numbers in the Santa Clara valley.

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THE ENTOMOLOGIST'S

DAILY POST CARD.

A Californian Journal of Entomology.

No. 112. Berkeley California, May 17. 1895.

BEHR, H

70.

Synopsis Noctuidarum hucusque in California repertarum.

Trans. Amer. Ent. Soc. Vol. III. pp. 23-28.

Hypena californica Behr* Agassizia urbicola Behr* Capnodes californica Behr* Ebebus odora Linn. Catocala zoe Behr* stretchii Behr* N. irene Behr* Bolina inundata Hub. cinis Gn. hadeniformis Behr* Syneda ochracea Behr* umbicola Behr* maculosa Behr* tejonica Behr. stretchii Behr* N. soria Behr* adumbrata Behr* divergens Behr* edwardsii Behr* Homoptera salacis Behr* rosae Behr*

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Further notes on Caprification. (con.)

ornios boghadhes These figs are strung on strings and hung in the orchard, two or three on each bearing tree and three times as many on each capri fig. When the orginos boghadhes grow close at hand there is no need of going to the mountains for capri figs to hang in the orchards. A poor crop of figs in Asia Minor is almost always attributable to severe weather in the winter injuring the crop of the orginos boghadhes, so that there are very few insects in the capri figs.

It thus appears that three distinct kinds of figs and one of the most remarkable species of insects are necessary for the production of the Smyrna fig.

Much yet remains to be learned before we will understand the matter sufficiently to know the reasons of all parts of the practice.

If the present attempts of introducing the insect fails a competant person should by all means be sent to Smyrna to investigate the matter.

—o—

Elytra partly red or yellow
Elytra with apical half black.....**demidiatus**, Lec. O.
Elytra with apical third black.....**affinus**, Lec.
Elytra with at most an apical black spot.....
.....**apicatus**, Say

—o—

University of California Entomological Society.

At the field meeting held today the Society decided upon a new feature of work. They now propose to make a special study of the local insect fauna. For this purpose it is proposed to establish a collection and a manuscript library.

The collection will be deposited in the laboratory of the Entomological department and be under the care of members of the Society. The details of the scheme are not all worked out yet but will include the apportionment of the orders among the voluntary curators who will consist of members pledged to increase the collections and manuscript library a definite amount.

The manuscripts will consist of notes on the specimens contained in the collections of the Society and include drawings as well as written matter. Sheets will be 5½ by 8½ or 8½ by 11 with margins as follows: smaller size one inch on the left for binding with a space 4 by 7 for writing and in the larger size 1½ inches for binding and 6 by 9 for writing.

As soon as the manuscript becomes complete enough in any subject an effort will be made to publish it All sheets will be signed and due credit will be given whenever the facts are published.

—o—

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 114. Berkeley California, May 20. 1895.

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Laboratory Manual. Ba.
SECOND WEEK.

NEEDED. — A number of house flies.

FIRST HOUR. — Carefully remove the wings mounting them in balsam by the same method as was employed for mounting the legs. Examine them under the microscope and write out a general description.

SECOND HOUR. — Attach the camera lucida to the eye piece. See that the mirror is adjusted so as to give the maximum light. Adjust the mirror of the camera to bring the image on the paper at the side of the microscope and put the darkened glasses in so that the pencil point will become distinctly visible It may be found useful to shade the paper if the image is indistinct and to diaphram down the light if the pencil point is invisible Having adadjusted the camera trace the veination carefully.

THIRD HOUR. — Study the veination in the light of Comstock's and of Williston's systems of nomenclaure. Indicate the names on the drawings.

70.

HORN, G. H.
Notes on some Genera of Coprophagus Scarabæidæ of the United States,
Trans. Amer. Ent. Soc. Vol. III. pp. 42-51.
Canthon indigaceus Lec A. puncticollis Lec. L. simplex Lec lavis Drury A
Amechanus serratus Lec. Odontæus obesus Lec.

Hind coxal plates very gradually dilated internally
Side margin of the thorax distinct its entire length
Punctulation of the thorax coarse and crowded .....
.....**fuscous.** Lec.
Punctulation of the thorax less coarse and not crowded....
.....**ferruginipennis.** Lec. O.
Side margins of the thorax obliterated except near the hind angles
Thorax very coarsely and densely punctured.....
.....**imperfectus,** Lec.
Thorax sparsely punctate .....**sparsus,** Lec. O.
Hind coxal plates rather suddenly dilated within
Side margin of thorax very incomplete
Abdomen densely punctate.....**hispidus,** Lec.
Abdomen sparsely punctate.....**opaculus,** Lec. O.
Side margins of the thorax sharply defined in its entire length
Antennæ with joint four longer than either two or three....
.....**nevadensis,** Lec. N.
Antennæ with joints two, three and four about equal
Abdomen finely and closely punctate
Elytra with basal two thirds red.....**apicalis,** Lec.
Elytra with only a large basal spot red **thevenetii,** Lec.
Abdomen coarsely and not closely punctate.....
.....**torquatus,** Lec.

—o—

Mr Woodworth goes to Mountain View tomorrow to investigate the grape leaf hopper.

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A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 115. Berkeley California, May 21. 1895.

HORN: G. H. 70.
Contribuaions to the Coleopterology of the United States.
Trans. Amer. Ent. Soc. Vol. III. pp. 69-97.

Caloroma tepidum Lec. latipenne Horn* Omophron gila Lec. A. obliteratum Horn* A. dentatum Lec. ovale Horn* Pseudomorpha behrensi Horn* Lichnanthe edwardsi Horn* O. Serica elongatula Horn* Valgus californicus Horn* Collops marginicollis Lec. cribrosus Lec. bipunctatus Say . . quadrimaculatus Fab. histrio Er. L. pulchellus Horn* A. laticollis Horn* L. Attalus elegans Horn* Chariessa elegans con.

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Laboratory Manual Bb.
THIRD WEEK.

NEEDED — A number of house flies.

FIRST HOUR — Remove and mount the antennæ and proboscis in balsam and mount other specimens in glycerine jelly as follows: With the point of a knife blade pick out a bit of jelly about the size of the end of a match and place it on the center of a glass slip, now lay the object to be mounted on the jelly and then lay the cover glass over all. The slip is now gently warmed until the jelly melts when the mounting fluid will flow out and fill the space beneath the cover and will harden again on cooling Much greater care is required than with balsam If they cannot be kept from the object remove the cover add a little more jelly and after warming the slip again replace the cover.

SECOND HOUR. — Study the antennæ and mouth parts making sketches and indicating the structural units and attempt to assign these to the corresponding parts of the elementary mandibulate mouth.

Claws simple
Thorax red marked with black.....**vulneratus,** Horn A.
Thorax all brown.....**pullatus,** Horn A.
Claws dentate from the middle to the base
Thorax narrower at the base than at the middle
Punctulation of thorax extremely fine.....**inanus,** Lec.
Punctulation of thorax very distinct
Elytra paler at base
Elytra with the basal fourth paler.....**basalis,** Horn
Elytra with only a reddish spot at each shoulder.....
.....**transfugus,** Lec.
Body uniform in color
Punctulation of thorax close and conspicuous
Thorax with basal plicæ small.....**densus,** Lec.
Thorax with basal plicæ well marked.....
.....**definitus,** Horn
Punctulation of the thorax not conspicuous.....
.....**sfflatus,** Lec.
Thorax as broad at base as at the middle
Thorax not longer than wide.....**simplex,** Lec.
Thorax longer than wide.....**gracilis,** Horn N.

—o—

The Live oak Worm. (con.)

very abundant. The loss of the leaves spoils the appearance of the tree. It is one of the easiest insects to destroy. For the purpose spray with Paris green one pound to two hundred gallons of water or dust the dry poison by hanging a small bag of it to the end of a fish pole and jaring it over the leaves.

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DAILY POST CARD.

A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 116. Berkeley California. May 22. 1895.

A New Grape Pest.

The insect which was reported as injurious to grapes about Mountain View proves to be an entirely different insect from the common grape hopper or thrips though belonging to the same family. The insect is by no means a new one being the largest and one of the common of our leaf hoppers. It is quite new as a vine pest however for the State Board of Viticulture could not identify it and the State Board of Horticulture pronounced it the buffalo hopper an insect of an entirely different family.

This in not the first season that the injury has been noticed for the insect has done more or less injury for some five years on the place where the observations were made. Some idea of the seriousness of the trouble may be gained from the fact that last year at this place one field of fourteen acres produced less than one tenth of a crop and the growth of new wood was in about the same proportion. Fortunately the insect is not so bad every con.

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HORN, G. H.

Contributions Etc. 70. (2.)

Horn* Ditylus bicolor Horn* O. cyanipennis Horn* Oxacis sericea Horn* N. Lytta magister Horn* deserticola Horn* A. refulgens Lorn* auriculata Horn* compressicornis Horn* Calospasta nemognathoides Horn* perpulchra Horn* mirabilis Horn* A. Tegrodera erosa Lec L. Mycetina limbata Horn* Epipocus unicolor Horn* A. Engis californica Horn*.

Palpi hairy
Spurs of hind tibiæ unequal
Outer spur of hind tibiæ thickened
Prothorax wider behind ..... **lurida**, Lec. O. A.
Prothorax not wider behind ..... **apicalis**, Lec.
Outer spur of hind tibiæ broad and flat
Tip of elytra black ..... **dichroa**, Lec.
Elytra all one color
Male with only the fifth segment of the abdomen broadly impressed ..... **lutea**, Lec.
Male with the fourth and fifth segment of the abdomen broadly impressed ..... **dubia**, Lec.
Spurs of hind tibiæ equal
Elytra finely and very densely punctured ..... **nigripennis**, Lec.
Elytra strongly and not densely punctured ..... **scutellaris**, Lec.
Palpi not hairy, only pubescent ..... **punctipennis**, Lec. A.

—o—

The Live oak Worm.

The live oaks suffer almost every year very severely from the effects of the larva of Phryganidia californica. This insect is a dull brown moth which flutters about the trees all day long but which are most active late in the afternoon. The eggs are deposited in bunches. The larvæ feed on the leaves and most of them pupate on the trunk and branches. They are quite subject to disease and sometimes a large Ichneumonid parasite becomes con.

THE ENTOMOLOGIST'S
DAILY POST CARD.
Published by the
Post Card Publishing Company,
2043 Lincoln St. Berkeley Calif

Organ of the
University of Calif Ent. Society
Entered at the post office at
Berkeley as second-class matter.
Subscription $2.00 per year

595.705
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DAILY POST CARD.

A CALIFORNIAN JOURNAL OF ENTOMOLOGY.

No. 117. Berkeley California, May 22. 1895.

HORN: G. H.
70.
Descriptive Catologue of the species of Nebria and Pelophila of the United States.
Trans. Amer. Ent. Soc. Vol. III. pp. 97-105.
Nebria ingens Horn* diversa Lec. O. sahlbergi Fisch. rathvoni Lec. eschscholtzii Men. Pelophila californica Motsch.

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A New Grape Pest. con.

only abundant and destructive in certain fields.

The appearance of an infested field is very striking and characteristic. The insect by puncturing the veins causes their partial atrophy resulting in the curling and wrinkling of the leaf to an extent quite equaling in extent the curled leaf lettuce.

The insect does not confine its attention to the grape but is found on a great variety of plants. During the growing season of the grape however but very few can be found on any other plant.

This is the insect to which attention was called in a recent number of the Post Card on account of its "weeping" powers. The experience at Mountain View fully confirms the suppositions there expressed for the showers are often sufficient to keep the ground wet beneath trees.

The habits of the insect suggests the method of treatment. If the vines are disturbed during the day the insects fly but at night they only drop to the

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Elytra with red or yellow lateral margin
Elytra with lateral stripe extending nearly to the apex.....
.....**fimbriolata**, Mels.
Elytra with lateral stripe extending to or a very little beyond the middle
Lateral stripe of equal width.....**lateralis**, Muls.
Lateral stripe suddenly dilated inwardly.....**tæniata**, Lec.
Elytra without colored lateral stripe
Elytra vittate.....**annexe**, Lec.
Elytra spotted
Elytra with a spot at about the middle.....**osculans**, Lec.
Elytra with a spot near the tip.....**postica**, Lec.
Elytra with a spot before the middle and another near the tip.....**4-oculata**, Mots.

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The True Thrps.

The small grape leaf hopper is so commonly called the "thrips" that many are not aware that there is another entirely different kind of insect to which the name really belongs. The true thrips are all small insects some of which attack other insects but the greater number are vegetable feeders The injury they do is very great. Our attention has been recently called to a number of cases of thrips injury to alfalfa, square pod pea and other leguminous forage plants. The fields have a general unthrifty appearance and the leaves are brown and spotted. If the plants are shaken over paper the insects may be seen. The only remedy is rotation of the crop.

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A New Grape Pest.

ground and lay there till the warmth of morning. Either catching them as they drop or killing them as they lay upon the ground. For the first method a frame could be rigged on the principle of a wheelbarrow and covered with cloth, fixing the slit for the trunk with stiff upturned edges of cloth to prevent the insects droping out. The second method needs but the use of watering pots and the resin soap mixture. The young insect does not drop so readily as the adults.

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Vacation Notice.

It was the intention at first to continue the publication of tha Post Card through the vacation but the press of work requires that the editor take advantage of postal regulations whereby publications connected with educational institutions may temporarily suspend during the vacation.

Subscribers will receive the three hundred numbers for the years subscription if paid during the year.

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HORN, G. H.
On the species of Oodes and allied genera of the United States.
Trans. Amer. Ent. Soc. Vol. III. pp. 105-109.
Oodes elegans Lec. A.
70.

Thorax clothed with long hair
Elatra and pygidium with long hair ..... **callipyge,** Lec.
Hairs on elytra and pygicium rather short
Body densely clothed with small scales... **pubicollis,** Lec.
Body not densely clothed with small scales
Beneath clothed with silvery scales..... **sackenii,** Lec.
Beneath clothed only with hairs..... **hirta,** Lec. N.
Prothorax with short hair..... **dispar,** Lec.

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County Horticultural Commissioners.

The recent decision of a Horticultural Commissioner at Madero shows very plainly the need of a change in the present system. One of the Hoplias has been very bad in Fresno county this year and evidently mistaking it for the rose bug and supposing that the rose bushes were in some way accountable for the presence of the insects has decreed that all the rose bushes about Madero should be destroyed. Certain of the parties who will be victims have appealed to the University to learn if this nonsensical proceeding cannot be prevented. The only course that suggested was to obtain a restraining order from court or to protest and sue for damages. It cannot be expected that men with sufficient scientific knowledge to decide upon such questions will be found for the position of County Commissioner. The importance of a central authority is very evident. The State Board of Horticulture is the proper head for the inspection system of the State.

The inspection system of the State will never attain the best results until organized with a competent central power.

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